	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	1/9

1. Product and Company Identification

- A. Product name : Calcium Nitrate (Tetra Hydrate)
- B. Relevant identified uses of the substance or mixture and uses advised against
- ☐ Recommended Use : Fertilizer, dyeing and finishing agent, refrigerant solvent.
 - ☐ Usage Limits : No data available
- C. Manufacture / Supplier/ Distributor information
- ☐ Company : Youngjin co. ltd.
 - ☐ Address : 38, Ojeong-ro, Ojeong-gu, Bucheon-si, Gyeonggi, Korea
 - ☐ Department : Quality Control Department
 - ☐ Telephone : 82-32-674-4221

2. Hazards Identification

A. Hazards Identification Classification


- Oxidative Solid : Classification 3

B. Warning marks

- ☐ Pictorial symbol



- ☐ Signal word: Warning
- ☐ Hazardous expression
 - H272 Makes fire intense
- ☐ Precaution expression
 - P210 Keep away from heat, spark, flame, high-temperature - NO SMOKING
 - P221 Keep store away from combustible materials and reducing agent and acid and metallic salts and clothing.
 - P280 Wear protective gloves/protective clothing/ eye protection/face protection.
- ☐ Respond
 - P307+P378 In case of fire, use proper fire extinguisher for suppression of fire.

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	2/9

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P312 If uncomfortable, consult medical personnel.

○ Storage

P420 Isolate from other(flammable) substances.

P402+P404 Keep in dry place. Store in airtight container.

○ Disposal

P501 Dispose of container in conformity with relevant regulations.

Dispose of container by incineration as general industrial waste.

Put contents in polyethylene bag or similar bag and bury in managed landfills.

Recycle container as polyethylene according to Waste Control Act clause 13-2.

C. NFPA Rating (0-4 level): Health=N/A Fire=N/A Reactivity=N/A

3. Composition, Information on Ingredients

Chemical Name	Idiomatic name	Percent (%)	CAS No.
Calcium Nitrate Tetrahydrate	Calcium Nitrate Tetrahydrate	100%	13477-34-4

4. First Aid Measures

A. Eye Contact


- Take emergency medical treatment
- In case of contact with substance, rinse eyes and skin with running water immediately for more than 20minutes.

B. Skin Contact

- Take emergency medical service.
- In case of contact with substance, rinse eyes and skin with running water immediately for more than 20minutes.
- Remove contaminated clothing and shoes and isolate contaminated area.
- Drying contaminated clothing may present fire hazard

C. Inhalation

- Take emergency medical service.
- Keep victim warm and stabilized.

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	3/9

- Move victim to place with fresh air.
- If breathing is hard, supply oxygen.
- If victim is not breathing, perform artificial respiration.

D. Ingestion

- Take emergency medical service.

E. Other medical notices.

- Let medical personnel recognize the material and take protective measure.

5. Explosion / Fire Fighting Measures

A. Appropriate (and inappropriate) Extinguishing Media


- Use alcohol foam, carbon dioxide or water spray.
- If extinguishing by smothering, use dry sand or earth.

B. Specific Hazards in Presence of Chemical Substances

- May ignite flammable substances(wood, paper, oil, clothing, etc)
- If boiled, container may explode.
- After drying, residue may work as oxidizer.
- May cause fire and explosion with intense polymerization.
- Leakage may present fire/explosion hazard.
- Contact with other flammable substances may cause fire.
- May explode by heat or contamination.
- React explosively with hydrocarbon(fuel) partly.
- May decompose explosively partly in case of fire or heat.
- Inhalation, ingestion, and contact of steam and substance may cause severe damage, burn, and death.
- Makes fire intense ; Oxidizer.
- Accelerates combustion in case of fire.
- Fire may generate irritative, corrosive, and toxic gas from material.

C. Precaution and Protective equipments for Fire Fighting

- Rescuer should use appropriate protective equipment.
- Spray much water on fire area distantly.
- If not dangerous, move container from fire area.
- Keep proper distance while extinguishing.
- Fire involving Tanks; If large scale fire, use unmanned fire apparatus, (if impossible to use) or step back and leave it burn.

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	4/9

- Fire involving Tanks; After extinguish, cool down container with water spray for considerable time.
- Fire involving Tanks; Extinguish fire in maximum range or use unmanned fire apparatus in case of tank fires.
- Fire involving Tanks; Do not approach tank in flames.
- If cargo is exposed to fire, do not move cargo or vehicle.

6. Accidental Release Measures

A. Require measures and protection to protect human body

- Keep leakage away from flammable substances.
- Remove all ignition sources as very minute particles may cause fire or explosion.
- Keep water out of container.
- If not dangerous, stop any leakage.
- Do not touch broken container or leaked material without appropriate protective clothing.
- Take notice of material and condition to avoid.

B. Required measures to protect environment

- Leakage may cause contamination.


C. Purification or removal method

- In case of big leakage, dig a ditch away from liquid leakage.
- In case of small leakage, use inflammable material like sand or vermiculite to absorb leakage and put in container.
- Build a dike for extinguishment and collect water.
- Wash contaminated area with water after controlling situation.
- Use clean shovel to put leakage into dry container and shut loose and move container away from leakage area.
- Do not use flammable substances like sawdust.

7. Handling & Storage

A. Safe handling

- Avoid mixing with flammable substance.
- Work according to Engineering Controls.
- Do not give pressure, cut, weld, solder, connect, drill, or grind. Do not expose to heat, fire, spark, static, or other ignition sources.

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	5/9

- Follow all precautions of MSDS/LABEL though container is emptied. Product residues can rest.
- Explosion may cause damage or death.
- Pay attention to Conditions and Materials to Avoid.

B. Safe Storage

- Keep away from heat, spark, flame, high-temperature - NO SMOKING
- Store product Isolating flammable substance like clothing, etc.
- Pay attention to Conditions and Materials to Avoid.

8. Exposure Controls & Personal Protection

A. Chemical Exposure Limits, Biological Exposure Limit

- Korean Regulation : No data available
- ACGIH Regulation : No data available
- Biological Exposure Limit : No data available

B. Engineering Controls


- Install facility to clean and wash up nearby working place for emergency.

C. Personal Protective Equipment

- Respiratory Protection
 - In case of frequent use or heavy exposure, respiratory protection is needed.
 - Respiratory protection is classified from minimum concentration to maximum concentration. Consider warning properties before use.
 - Respiratory protection against dust, mist, and hume .
 - Air filtering respirator (high efficiency particulate filter)
 - Respirator equipped with motor fan(filter media for dust, mist, and hume)
 - Self-contained respirator equipped with high efficiency particulate filter
 - In case of unknown concentration or other urgent danger to life and health.
 - Supplied air respirator(combination airline mask)
 - Air respirator(full facepiece)
- Eyes Protection : Wear dust-proof safety goggles.
- Hands Protection : Wear appropriate chemical-resistant gloves.
- Body Protection : Wear appropriate chemical-resistant apron and boots.

9. Physical & Chemical Properties


A. Appearance: Colorless, white solid crystal (deliquescent)

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	6/9

- B. Odor: None.
- C. Odor Threshold : None
- D. PH (5%) : 5.0~7.0
- E. Melting point/Freezing point: 43°C / No data available.
- F. Initial Boiling point and Boiling point range: N/A
- G. Flash point: No data available
- H. Evaporation Rate: No data available
- I. Flammability (solid, gas): nonflammable
- J. Low & Upper limit of Flammable or Explosion Range: N/A.
- K. Vapor Pressure: N/A
- L. Solubility: (1) Solubility(Water) : 266% at 0°C
 (2) Soluble : Alcohol, acetone
 (3) Valid insolubility : Concentrated nitric acid.
- M. Vapor Density: 8.17
- N. Specific Gravity: 1.896(Water=1)
- O. n-Octanol/water partition coefficient: None.
- P. Auto-ignition Temp.: No data available.
- Q. Decomposition Temp.: 132°C
- R. Viscosity: No data available.
- S. Molecular Formular / Molecular Weight : $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ / 236.15

10. Stability & Reactivity

- A. Chemical stability and Possibility of hazardous reactions
- Make fire intense ; Oxidizer
 - Contact with other flammable substances may cause fire.
 - Steam, inhalation, ingestion, skin contact may cause severe injuries and death.
 - Fire may generate irritative, corrosive, toxic gas from material.
 - React explosively with hydrocarbon(fuel) partly.
 - May explode by heat or contamination.
 - May decompose explosively partly in case of fire or heat.
 - After drying, residue may work as oxidizer.
 - May cause fire and explosion with intense polymerization.
 - May ignite flammable substances(wood, paper, oil, clothing, etc)
 - If boiled, container may explode.

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	7/9

- Leakage may present fire/explosion hazard.
- Accelerates combustion in case of fire.

B. Conditions to Avoid : Keep away from heat, spark, fire, high temperature - NO SMOKING

C. Materials to Avoid :

- Flammable substances(wood, paper, oil, clothing, etc)
- Take measure not to mix up with flammable substances.
- Isolate flammable substances like clothing
- Fuel.

D. Hazardous Decomposition Products

- Irritative, corrosive, toxic gas.

11. Toxicological Information

A. Information about possible exposure route : No data available

B. Health effect : No data available

○ Acute oral toxicity:

- ORAL : LD₅₀ 3900 mg/kg Rat
- SKIN : No data available.
- Inhalation : No data available

○ Skin corrosivity or irritation :

- The result of draize test (500mg/24h) on rabbit showed slight irritation.

○ Severe eye damage or irritation :

- The result of drazie test(500mg/24h) on rabbit showed slight irritation.


○ Respiratory sensitization : No data available

○ Skin sensitization : No data available.

○ Carcinogenesis

- Occupational Safety and Health Act : No data available
- Ministry of Employment and Labor : No data available.
- IARC : No data available
- OSHA : No data available
- ACGIH : No data available
- NTP : No data available
- EU : No data available
- CLP : No data available

○ Gamete Mutagenicity : No data available

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	8/9

- Reproductive toxicity : No data available
- Specific target organ toxicity (single exposure) : No data available
- Specific target organ toxicity (repeated exposure) : No data available
- Aspiration Hazard : No data available

12. Ecological Information


- A. Aquatic & Eco-toxicity:
 - Fish : No data available
 - Crustacean : No data available
 - Algae : No data available
- B. Residue property and degradability
 - Residue property : No data available
 - Degradability : No data available
- C. Bioaccumulative potential
 - Bioaccumulation : No data available
 - Biodegradation : No data available
- D. Movement in soil: No data available
- E. Other hazardous effect : No data available

13. Disposal Considerations

- A. Disposal method
 - Dispose of contents/container according to Waste Control Act(if specified).
- B. Disposal Considerations
 - Dispose of container in conformity with relevant regulations.

14. Transport information

- A. UN Number : 1454
- B. UN proper shipping name : CALCIUM NITRATE
- C. UN hazardous ranking : 5.1
- D. Un package group : 3
- E. Marine pollutant : No data available
- F. Special precautions:

	Material Safety Data Sheet(MSDS-GHS)	Date of establishment	June, 3, 1996.
	Calcium Nitrate (Tetra Hydrate)	Date of revision	Jan, 24, 2019.
		Page	9/9

- In case of fire : F-A
- in case of leakage : S-Q

15. Regulatory Information

- A. Regulation by Occupational Safety and Health Act : N/A
- B. The Chemicals Control Act : N/A
- C. Dangerous Material Safety Management Regulation : N/A
- D. Waste Control Act : N/A
- E. Other regulation by Korea and foreign acts
 - Korean Regulation
 - Persistent organic pollutants control acts : N/A
 - Foreign Regulation
 - U.S.A management information(OSHA Regulation) : N/A
 - U.S.A management information(CERCLA Regulation) : N/A
 - U.S.A management information(EPCRA 302 Regulation) : N/A
 - U.S.A management information(EPCRA 304 Regulation) : N/A
 - U.S.A management information(EPCRA 313 Regulation) : N/A
 - U.S.A management information(Rotterdam Protocol) : N/A
 - U.S.A management information(Stockholm Protocol) : N/A
 - U.S.A management information(Montreal Protocol) : N/A
 - EU classification information(Classification) : N/A
 - EU classification information(Risk Phases) : N/A
 - EU classification information(Safety Phrases) : N/A

16. Other Information

- A. Data Source : Korean Occupational Safety and Health Act.
- B. Date of establishment : June, 3, 1996.
- C. Revision Number and recent revision date : Rev. No.8 / Jan, 24, 2019.
changes : 2. Hazards Identification→ Hazardous expression p221, Respond P307+P378
- D. Others : None.