

GHS-0052E

SAFETY DATA SHEET

PRODUCT NAME Inner solution

Data of issue 09/26/2011

[1mol/L Lithium chloride solution (Ethanol solvent)]

Date of revision 11/28/2015

1 Identification of the substance or mixture and the supplier

Product name:	Inner solution [1mol/L Lithium chloride solution (Ethanol solvent)]
Name of supplier:	Kyoto Electronics Manufacturing Co., Ltd.
Address:	68 Ninodan-cho, Shinden, Kisshoin, Minami-ku, Kyoto, Japan
Division:	Quality Assurance Department
Phone:	+81-75-691-4121
Fax:	+81-75-691-4127
Emergency phone No.:	+81-75-691-4125
MSDS No.	GHS-0052E

2 Hazard identification

GHS hazard class and category

Physical hazards;	Flammable liquids:	Category 2
Health hazards;	Skin corrosion/irritation:	Category 3
	Eye damage/irritation:	Category 2A
	Germ cell mutagenicity	Category 1B
	Toxic to reproduction	Category 1A
	Specific target organ systemic toxicity (single exposure):	Category 3 (Respiratory tract irritation, Narcotic effects)
	Specific target organ systemic toxicity (repeated exposure):	Category 1 (Liver) Category 2 (Central nervous system)

Other hazard identification are not shown above because of the reasons below;

Not applicable / Classification not possible

Label elements

Pictogram



Signal word

Danger

Hazard statements	<p>Highly flammable liquid and vapour</p> <p>Causes mild skin irritation</p> <p>Causes serious eye irritation</p> <p>May cause genetic defects</p> <p>May damage fertility or the unborn child</p> <p>May cause respiratory irritation; or May cause drowsiness and dizziness</p> <p>Cause damage to organs (Liver) through prolonged or repeated exposure</p> <p>May cause damage to organs (Central nervous system) through prolonged or repeated exposure</p>
Precautionary statements	
Prevention	<p>Keep container tightly closed. Keep away from ignition sources such as heat/sparks/open flame. –No smoking. Wear protective gloves/clothing/eye/face protection. Ground/bond container and receiving equipment. Use explosion–proof. Take precautionary measures against static discharge. Use only non–sparking tools.</p> <p>Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.</p> <p>Use only outdoors or in a well–ventilated area.</p> <p>Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Do not breathe dust/fume/gas/mist/vapours/spray.</p>
Response	<p>In case of fire, use for extinction appropriate media.</p> <p>IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.</p> <p>If skin irritation occurs, get medical advice/attention.</p> <p>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice /attention. Wash hands after handling.</p> <p>Get medical attention/advice if you feel unwell. IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.</p>
Storage	<p>Store container tightly closed in cool well–ventilated place.</p> <p>Store locked up.</p>
Disposal	<p>Dispose of contents and container in accordance with regulation.</p>

3 Composition/Information on ingredients

Substance/Mixture:	Mixture
Chemical identity (or common name):	1mol/L Lithium chloride solution (Ethanol solvent)

Ingredient name	Composition (%)	Chemical formula	CAS No.
Lithium Chloride	4.2	LiCl	7447-41-8
Ethanol	–	C2H5OH	64-17-5

Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance;
None

4 First-aid measures

General description of necessary first aid measures:	<p>[Emergency Response Guidebook]</p> <p>Move victim to fresh air.</p> <p>Keep victim warm and quiet.</p> <p>Call emergency medical service.</p> <p>Apply artificial respiration if victim is not breathing.</p> <p>Administer oxygen if breathing is difficult.</p> <p>Remove and isolate contaminated clothing and shoes.</p> <p>In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.</p> <p>Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.</p>
Inhalation:	<p>In case of accident by inhalation: remove casualty to fresh air and keep at rest.</p> <p>If breathing is weak, irregular or has stopped, open his airway, loosen his collar and belt and administer artificial respiration.</p>
Skin contact:	<p>[Emergency Response Guidebook]</p> <p>Wash skin with soap and water.</p> <p>Take off immediately all contaminated clothing.</p>
Eye contact:	<p>In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.</p>
Ingestion:	<p>If swallowed, seek medical advice immediately and show this container or label.</p> <p>Rinse mouth with water. Give the person one or two glasses of water, try to get victim to vomit by having the victim touch the back of their with a finger.</p> <p>Do not make an unconscious person vomit.</p>
Most important symptoms/effects, acute and delayed:	<p>Inhalation: Cough Headache Fatigue Drowsiness</p> <p>Skin: Dry skin</p> <p>Eyes: Redness Pain Burning</p> <p>Ingestion: Burning sensation Headache Confusion Dizziness Unconsciousness</p>
Protections for first-aid persons:	<p>Protect yourself by wearing rubber gloves and air-tight safety goggles.</p>
Information for the physician:	<p>(Ethanol) [ACGIH 2004] Irritation</p>

5 Fire-fighting measures

Extinguishing media:	<p>[Emergency Response Guidebook]</p> <p>CAUTION: All these products have a very low flash point. Use of water spray when fighting fire may be inefficient.</p> <p>In case of fire, use water mist, water in large amounts, water resistant form, dry powder, carbon dioxide, and dry sand.</p> <p>Use extinguishing media appropriate to surrounding fire conditions.</p>
Incompatible extinguishing media:	<p>Do not use (normal) foam extinguisher on this material.</p>
Specific hazards arising from the chemical (and with regard to fire-fighting measures):	<p>[Emergency Response Guidebook]</p> <p>Fire may produce irritating, corrosive and/or toxic gases.</p> <p>Run off from fire control or dilution water may cause pollution.</p> <p>Toxic gases will form upon combustion of: carbon monoxide/chlorine /hydrogen chloride.</p>
Specific fire-fighting measures:	<p>Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area. Fight the fire from a windward direction. Dry chemical powder or dry sand should be used for small fires. Form extinguisher is effective for a large scale fire.</p>
Special protective equipment and precautions for fire-fighters:	<p>Fire-fighters should wear proper protective equipment.</p>

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures:	<p>[Emergency Response Guidebook]</p> <p>Do not touch or walk through spilled material.</p> <p>Evacuate non-essential personnel.</p> <p>Wear appropriate protective clothing.</p>
Environmental precautions:	<p>Attention should be given not to cause damage to the environment by flowing of spillage to rivers.</p>
Measures and materials for containment and clean up:	<p>[Emergency Response Guidebook]</p> <p>A vapour suppressing foam may be used to reduce vapours.</p> <p>For small spill, absorb spill with absorbent and move to a chemical waste container. For large spill, prevent leakage by surrounded with earth and lead the spill to a safety place to collect.</p>
Appropriate containment techniques/clean up procedures:	<p>Shut off the leakage source and stop leak if you can do it without risk.</p>
Preventive measures for secondary accident:	<p>[Emergency Response Guidebook]</p> <p>Keep unauthorized personnel away.</p> <p>Stay upwind.</p> <p>Keep out of low areas.</p> <p>Ventilate closed spaces before entering.</p> <p>Prevent entry into waterways, sewers, basements or confined areas.</p> <p>Eliminate all sources of ignition and ventilate the area.</p> <p>Prepare extinguishers before catching fire.</p>

7 Handling and storage

Precautions for safe handling:

Countermeasure technique(s):	(Exposure control for handling personnel) Wear proper equipment and take measures according to [8. Exposure control/personal protection].
Local exhaust ventilation system/general ventilation:	Ventilation according to [8. Exposure control/personal protection].
Preventive measures:	[Emergency Response Guidebook] Most vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Many liquids are lighter than water. Use with an enclosed system or a local exhaust ventilation.
Incompatible contact(s):	See [10. Stability and reactivity]
Safety measures/incompatibility:	Do not shock, overturn, drop, or drag containers.

Conditions for safe storage, including any incompatibilities:

Countermeasure technique(s):	Take precautionary measures against static discharges. Take measures to prevent electrostatic charging. Keep away from sources of ignition and heat. Tightly closed in a well-ventilated place.
Incompatibilities:	See [10. Stability and reactivity]
Storage:	(Recommendation for storage) Keep tightly closed in dark cool place. (incompatible storage condition) Fire is strictly prohibited. Separated from strong oxidants.
Recommendation on container and packaging materials:	Glass, etc.

8 Exposure controls/Personal protection

Appropriate engineering controls:	Keep source tightly closed or install local exhaust ventilation. Provide shower and vanity unit nearby and make clear the location of these.
Control value:	Japan control value (2005) Not established.
Adopted value:	[JSOH] Not established. (Ethanol (anhydrous)) [ACGIH 2007] 1000ppm as TWA (Ethyl alcohol) NIOSH REL: TWA 1000ppm (1900 mg/m ³) (Ethyl alcohol) OSHA PEL: TWA 1000ppm (1900 mg/m ³) (Ethanol (anhydrous)) [DFG 2004] MAK: 500ppm, 960 mg/m ³ ; Peak limitation category: II (2)

Individual protection measures, such as personal protective equipment (PPE):

Respiratory protector:	[Emergency Response Guidebook] Wear positive pressure self-contained breathing apparatus (SCBA). Gas masks for organic compounds
Hand protection:	Wear impervious glove made from chloroprene, as appropriate.
Eye/face protection:	Wear protective eyeglasses or chemical safety goggles. Wear face protection.
Skin and body protection:	[Emergency Response Guidebook] Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible. To prevent any contact, wear impervious clothing such as apron, boots, or whole-body suits made from chloroprene, as appropriate.

9 Physical and chemical properties

Appearance, color:	Colorless liquid
Odor:	Characteristic odor
pH:	Not available
Melting point/ freezing point:	Not available
Boiling point:	Not available
Flash point:	13C (c.c.) (Ethanol)
Auto-ignition temperature:	363C (Ethanol)
Upper/lower flammability or explosive limits:	Lower limit; 3.3% (Ethanol) Upper limit; 19% (Ethanol)
Vapour pressure:	5.8kPa (20C) (Ethanol)
Vapour density (Air = 1):	1.6 (Ethanol)
Specific gravity (Density):	Not available
Solubility:	Solubility in water; Very soluble (Ethanol) Solubility in solvent; Very soluble in diethyl ether (Ethanol)
Octanol/water partition coefficient (log Pow):	-0.32 (Ethanol)
Decomposition temperature:	Not available
Viscosity:	Not available
Other data:	Volatile

10 Stability and reactivity

Chemical stability:	Volatile This product is considered a stable material under normal and anticipated storage and handling conditions.
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Possibility of hazardous reactions:	Reacts with strong oxidants.
Conditions to avoid:	Sunlight, heat, contact with incompatible materials.
Incompatible materials:	Strong oxidants, polyvinyl chloride resin, acrylic resin, polystyrene, etc.
Hazardous decomposition products:	Toxic fumes of chloride/hydrogen chloride. (except for carbon monoxide, carbon dioxide and water)

11 Toxicological information

No data as this product.

For reference, the information of each Lithium chloride and Ethanol is as follows.

Information on ingredients <Lithium chloride>

Acute toxicity:	Harmful if swallowed.						
Oral:	<table> <tr> <td>rat</td> <td>LD50 1530 mg/kg</td> </tr> <tr> <td>mouse</td> <td>LD50 1165 mg/kg</td> </tr> <tr> <td>rabbit</td> <td>LD50 775 mg/kg</td> </tr> </table>	rat	LD50 1530 mg/kg	mouse	LD50 1165 mg/kg	rabbit	LD50 775 mg/kg
rat	LD50 1530 mg/kg						
mouse	LD50 1165 mg/kg						
rabbit	LD50 775 mg/kg						
Irritant properties:	Irritant severely to eyes and skin.						
Irritant properties to skin;	<table> <tr> <td>rabbit</td> <td>500 mg/24H:Severe</td> </tr> </table>	rabbit	500 mg/24H:Severe				
rabbit	500 mg/24H:Severe						
Irritant properties to eyes;	<table> <tr> <td>rabbit</td> <td>100 mg/24H:Moderate</td> </tr> </table>	rabbit	100 mg/24H:Moderate				
rabbit	100 mg/24H:Moderate						
Allergenic and sensitizing effects:	Not available						
Chronic toxicity:	Not available						
Carcinogenic effects:	Not available						
Mutagenic effects:	Not available						
Toxicity for reproduction:	Not available						

Information on ingredients <Ethanol>

Acute toxicity:	
Oral:	It was set as the outside of Category by the statement of "rat oral LD50=6.2-17.8 g/kg bw.>5 g/kg bw" (DFGOT vol.7 (1996, p148) and Patty (5th, 2005, p385)).
Dermal:	Not available
Inhalation; gas:	Liquid (GHS definition)
Inhalation; vapour:	Since LC 50 = 20000ppm/10H for rat inhalation (RTECS (2004)) is less than ethanol saturated vapour pressure concentration of 56580ppm at 20C, it is considered to be an inhalation test with steam. Furthermore, based on 20000ppm/10H* $\sqrt{10/\sqrt{4}}$ = 31600ppm/4h >12500ppm (gas: 5000ppm (Category 4) *2.5), it was classified as out of Category.

Inhalation; dust, mist:	<p>“Rat inhalation LC50 (4h) = about 63000ml/m³ = 63000ppm (based on the definition of DFG. DFGOT (1996))”. Since it was over the ethanol saturated vapour pressure pressures concentrations of 56580ppm in 20C, it was classified as an inhalation test by mist. Furthermore, based on 63000ppm*1.88mg/m³ = 118mg/L >12.5mg/L (mist 5mg/L(mist 4 Category) *2.5), it considered as the outside of Category.</p>
Skin corrosion/irritation:	<p>It was classified as out of Category by the statement of “not being stimulative in the test according to OECD TG404 and American guidelines” (DFGOT (1996)).</p>
Serious eye damage/eye irritation:	<p>Based on statements of “by the test according to OECD TG405 and Draize test, it was classified with moderate”(DFGOT (1996)), and “the injury of an anterior epithelium of cornea, and conjunctival injection in humans recover in 1 or 2 days” (ACGIH (2001)), it was set as Category 2A-2B.</p>
Respiratory/skin sensitizer:	<p>Skin sensitization: Although there are statements of skin sensitization that there are case reports of contact dermatitis caused by the allergic reaction to alcohol in humans(DFGOT (1996)), as there are cases in which cross reactions with other first class or second class alcohol may be seen in humans and no significant skin sensitization is identified in animal tests, the description that Aethanol has the skin sensitization cannot be fully supported with data. (ACGIH (2001), DFGOT (1996), IUCLID (2000)) .Therefore, it was decided that the skin sensitization could not be classified due to the absence of sufficient data.</p> <p>Respiratory sensitization: Although there are case reports on humans, such as asthmatic inducement by an asthmatic’s alcoholic suction, it is not considered that the origin is an allergic reaction” (DFGOT (1996)). However, since the knowledge about the inhalation sensitization in the other humans and data on inhalation sensitization tests of animals are not found, it was decided that it could not be classified due to insufficiency of data.</p>
Germ cell mutagenicity:	<p>We classifies it as Category 1B. Based on the report of dominant fatality in the rat and the mouse, and on the report of the heteroploidy induction in the mouse productive cells (DFG (1999), IARC (1988)).</p>
Carcinogenicity:	<p>It has classified into the group 1 according to IARC as “carcinogenic is in humans as a tonsil paint.” This acknowledges which the causal relationship of the esophagus system cancer, liver cancer and an alcoholic drinks, based on numerous epidemiological studies of the humans who take in an alcoholic drinks habitually (DFGOT (1996)). On the other hand, ACGIH has classified ethanol into A4 (the substance which cannot be classificationed into human carcinogenicity, ACGIH (1996)) mainly as a hazardous property factor in work environment. Here, the hazardousness of alcoholic beverages as luxury grocery items was not assessed and classified, but it thought that the toxicity of ethanol was assessed. Therefore, it carried out the outside of Category according to A4 classified by ACGIH and technical guide.</p>
Toxic to reproduction:	<p>It is classified into the Category 1A because it is reported that many adverse effect as fetal malformation etc. to human embryo by habitual large intakes of alcohol (DFGOT (1996)).</p>

Specific target organs/systemic toxicity following single exposure:	There is the description that "the oral ingestion of ethanol may effect to central nervous systems, may cause the headache, fatigue, the fall of concentration (ICSC (2000)), and may cause death in the case of acute intoxication in human"(DFGOT (1996)), and the description that "inhalation by 5000ppm (9.4mg/L) causes the respiratory irritation, stupor, pathological sleep in human"(ACGIH (2001)). So it is classified into Category 3 (respiratory irritation, anesthetic action)
Specific target organs/systemic toxicity following repeated exposure:	"A damage is caused in almost all organs of humans by long-term extensive alcohol ingestion, and the target organ which has a most harmful effects is liver. The disorder started the fatty degeneration and finished in the hepatic cirrhosis after affecting necrotic and fibrillization.(DFGOT (1996))." According to this statement, it was classified to Category 1. Moreover, it was classified to as Category 2 (nerve) based on the statement of "withdrawals symptoms of alcoholics (symptoms of tremor, epilepsy, mental confusions)" (HSDB, (2003)).
Aspiration hazard:	Not available

12 Ecological information

No data as this product.

For reference, the information of each Lithium chloride and Ethanol is as follows.

Information on ingredients <Lithium chloride>

Biotransportability:	Not available
Persistence and degradability:	Not available
Bioaccumulative potential:	Not available
Ecotoxicity:	Not available
Fish toxicity:	Not available

Information on ingredients <Ethanol>

Hazardous to the aquatic environment (acute):	It carried out the outside of Category from 48-hour LC50=5463.9mg/L of Crustacea(Daphnia magna) (ECETOC TR91, 2003).
Hazardous to the aquatic environment (chronic):	Since not water-insoluble (water solubility=1.00 × 10 ⁶ mg/L (PHYSPROP Database, 2005)) and acute toxicity is low.

13 Disposal considerations

Contact a licensed professional waste disposal service to dispose of this material. Comply with all country, national and local regulations. Do not dump this product into sewers, on the ground or into any body of water.

14 Transport information

Basic classification information for the transporting/shipment:



UN Number: 1170
Class or Division: 3
Packing group: II
UN Proper shipping name: ETHANOL SOLUTION

Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises:

- Protection from direct sun light in transportation, and confirm the container does not leak.
- Carefully load it onto a transporter without dropping, overturning or damaging so that it will stably stays on the transporter.
- Fire is strictly prohibited.

15 Regulatory information

Follow all laws and regulations in your country.

Disclaimer

For R&D use only. Not for drug, household or other uses.

Warranty

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product.