MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME	:	CO2 Trap Cartridge, replacement cartridges for removing carbon dioxide and moisture protection.
NAME OF SUPPLIER	:	GL Sciences Inc.
ADDRESS	:	22-1 Nishishinjuku 6-chome Shinjuku-ku Tokyo 163-1130, Japan
CHARGE SECTION	:	International Sales Section
TELEPHONE No.	:	+81-3-5323-6620
FACSIMILE No.	:	+81-3-5323-6621
PRODUCT No.	:	6010-92050, 6010-92060, 5010-29902、5010-、6010-
MSDS No.	:	6010-0001

Research use only.

2. HAZARDS IDENTIFICATION

This product consists of a CO2 trap cartridge and a dedicated solvent bottle and parts.
The solvent bottle and parts, luer stop valve, and plug are molded products and are not classified as hazard ous.The three cartridges are filled with silica gel for moisture removal, Ascarite II for CO2 removal, and Acti ve alumina for moisture absorption protection, and are used for testing and research, especially in the field of chromatography.

《CO2 absorbing cartridge [Silica gel]》

GHS CLACCIFICATION	:	Not classificable
HAZARDS SYMBOL	:	- - -
SIGNAL WORD	:	- - -
HAZARD STATEMENTS	:	- - -
PRECAUTIONARY STATEMENTS	:	- - -
OTHER INFORMATIONS	:	May be harmful if inhaled and ingested. May cause eye and skin irritation. Dispose of contents/container in accordance with all applicable regulations.
MOST IMPORTANT HAZARDS	:	Eye irritation, skin irritation, digestive tract irritation, respiratory tract irritation.

《CO2 absorbing cartridge [Ascarite Ⅱ]》

GHS CLASSIFICATION	:	Skin corrosion/irritation : Category 1 Serious eye damage/eye irritation : Category 1 Specific target organ toxicity - single exposure : Category 1<respiratory system> Acute aquatic toxicity : Category 3
HAZARD SYMBOL	:	
SIGNAL WORD	:	Danger
HAZARD STATEMENTS	:	
H314		Causes severe skin burns and eye damage.
H318		Causes serious eye damage.
H370		Causes damage to respiratory system.
H402		Harmful to aquatic life.
PRECAUTIONARY STATEMENTS	:	
P260		Do not breathe dust/fume/gas/mist/vapours/spray.
P264		Wash hands thoroughly after handling.
P270		Do not eat, drink or smoke when using this product.
P273		Avoid release to the environment.
P280		Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331		IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353		IN ON SKIN or hair: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340		IN 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.
P307+P311		IF exposed: Call a POISON CENTER or doctor/physician.
P363		Wash contaminated clothing before use.
P405		Store locked up.
P501		Dispose of contents/ container to an approved waste disposal plant.

《Moisture protection cartridge [Active alumina]》

GHS CLASSIFICATION : Specific target organ toxicity (Single exposure)
: Category 3(respiratory irritation)
Specific target organ toxicity (Repeated exposure)
: Category 1(lungs)

HAZARD SYMBOL :

SIGNAL WORD : Danger

HAZARD STATEMENTS :

H335	May cause respiratory irritation
H372	Cause damage to organs through prolonged or repeated exposure

PRECAUTIONARY STATEMENTS :

P260	Do not breathing dust.
P271	Use only outdoors or in a well-ventilated area.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breat hing.
P314	Get medical attention if you feel unwell.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container in accordance with all applicable regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

[Silica gel]

CHEMICAL NAME	CONTENT	SYNONYMS	CHEMICAL FORMULA	CAS No.	TSCA INVENTRY	EINECS No.
Silica gel	--	--	SiO_2	7631-86-9	Listed	231-545-4

[Ascarite Ⅱ]

CHEMICAL NAME	CONTENT	SYNONYMS	CHEMICAL FORMULA	CAS No.	TSCA INVENTRY	EINECS No.
Sodium hydroxide	90-95%	Caustic soda	NaOH	1310-73-2	Listed	215-185-5
Vermiculite	5-10%	Zololite®	$(Mg,Fe)_3(Si,Al,Fe)_4O_{10}(OH)_2 \cdot 4H_2O$	1318-00-9	Not Listed	Not Listed

[Active alumina]

CHEMICAL NAME	CONTENT	SYNONYMS	CHEMICAL FORMULA	CAS No.	TSCA INVENTRY	EINECS No.
Aluminium oxide	--	Alumina, α -alumina	Al_2O_3	1344-28-1	Listed	215-691-6

4. FIRST AID MEASURES

GENERAL ADVICE : If fragments/respirable dust contacts with eyes or skin, wash off immediately with soap and plenty of water. In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit. Use personal protective equipment. If irritation persists, consult a physician.

INHALATION : Move victim to fresh air and gargle. If breathing is difficult, give oxygen.
If irritation persists, consult a physician.

SKIN CONTACT : Remove contaminated clothes and shoes, rinse skin with plenty of water or shower. Use soap to help assure removal. If irritation persists, consult a physician.

EYE CONTACT : Remove any contact lenses at once. Flush eyes well with flooding large amounts of running water for at least 15 minutes. Assure adequate flushing by separating the eyelids with sterile fingers. If irritation persists, consult a physician.

INGESTION : Rinse mouth, give plenty of water to vomit. Never give anything by mouth to an unconscious person. Consult a physician.

MOST IMPORTANT SYMPTOMS AND EFFECTS

: Shreds and dusts may cause irritation of mucous membranes, respiratory tract, skin and eyes.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA : This product is noncombustible.

FIRE & EXPLOSION HAZARDS : Toxic and irritating dust, fumes or smoke may be emitted.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS

: Fireman should wear normal protective equipment (full bunker gear) and positive-pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS : Remove ignition sources and ventilate the area.
In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid raising dust and avoid contact with skin and eyes.

ENVIRONMENTAL PRECAUTIONS : Prevent spills from entering sewers, watercourses or low areas.

METHODS FOR CLEANING UP : Do not touch spilled material without suitable protection. After material is completely picked up, wash the spill site with soap and water and ventilate the area. Pull all wastes in a plastic bag for disposal and seal it tightly. Remove, clean, or dispose contaminated clothing.

7. HANDLING AND STORAGE

HANDLING : Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Handle material with suitable protection.
After using this product, dispose of contents/container in accordance with all applicable regulations and appropriate ways.

STORAGE : Store away from moisture and water in well-ventilated dry place.
Keep container tightly closed.

INCOMPATIBLE PRODUCTS : Water, moisture、strong oxidizers, acids.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING MEASURES : Use exhaust ventilation to keep airborne concentrations below exposure limits.
Use adequate ventilation.

VENTILATION : Local Exhaust ; Necessary, Mechanical(General) ; Recommended

PERSONAL PROTECTION

Respiratory protection : Use respirators approved under appropriate government standards and follow all regulations.

HAND PROTECTION : Chemical resistant gloves

EYE PROTECTION : Safety glasses(goggles)

SKIN PROTECTION : Protective clothing

CONTROL PARAMETERS

CHEMICAL NAME	OSHA PEL	NIOSH REL	ACGIH
Silica gel	--	--	3mg/m^3
Sodium hydroxide	CL 2mg/m^3(air)	C 2mg/m^3	CL 2mg/m^3
Vermiculite	Not available	Not available	Not available
Aluminium oxide	TWA 15mg/m^3(total) TWA 5 mg/m^3(resp.)	Not available	TWA 10mg/m^3 (total)

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE : Powder

COLOUR : slightly light yellow to light brown ; Ascarite Ⅱ.
slightly light white-gray to white ; Active almina.

ODOR : Odorless

MELTING POINT / FREEZING POINT

: No data available

BOILING POINT OR INITIAL BOILING POINT AND BOILING RANGE
: No data available
FLAMMABILITY : No data available
LOWER AND UPPER EXPLOSION LIMIT / FLAMMABILITY LIMIT
: No data available
FLASH POINT : No data available
AUTO-IGNITION TEMPERATURE : No data available
DECOMPOSITION TEMPERATURE
: No data available
pH : No data available
KINEMATIC VISCOSITY : Not applicable
SOLUBILITY
Water : insoluble
Organic solvent : insoluble
PARTITION COEFFICIENT
n-octanol/water (log value) : No data available
VAPOUR PRESSURE : No data available
DENSITY AND/OR RELATIVE DENSITY
: No data available
RELATIVE VAPOUR DENSITY : No data available
PARTICLE CHARACTERISTICS : Not applicable

10. STABILITY AND REACTIVITY

REACTIVITY : Stable under recommended storage conditions.
CHEMICAL STABILITY : Reacts with strong oxidizers.
CONDITION TO AVOID : Sunlight, heat, open flames, high temperature, sparks, static electrical charge, other ignition sources, moisture
INCOMPATIBLE MATERIALS : Oxidizers and strong acids
HAZARDOUS DECOMPOSITION PRODUCTS
: CO, CO_2. Nitrogen oxides, cyanides

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Oral) : No data available.
ACUTE TOXICITY (Dermal) : No data available.
ACUTE TOXICITY (Inhalation: Vapors)
: No data available.
ACUTE TOXICITY (Inhalation: Dusts and mists)
: No data available.
SKIN CORROSION/IRRITATION :
(Sodium hydroxide) : In a study in which 2N (8%), 4N (16%), and 6N (24%) solutions were a pplied to the abdomen of pigs, large blisters appeared within 15 minutes, the 8% and 16% solutions caused severe necrosis in all epidermal laye rs, and the 24% solution caused numerous and severe blisters with necr osis deep into the subcutaneous tissue (SIDS (2009)). (SIDS (2009)), an d severe necrosis was reported when a 5% aqueous solution was applie d to rabbit skin for 4 hours (ACGIH (7th, 2001)). The pH is 12 (0.05% w/w) (Merck (14th, 2006)). It is classified as C and R35 in the EU classi fication.
EYE DAMAGE/EYE IRRITATION :
(Silica gel) : In an eye irritation test (OECD TG 405) using rabbits, it was reported th at application of precipitated silica (CAS No.: 112926-00-8) did not cause irritation (SIDS (2006), ECETOC JACC (2006)). There are several reports of studies in which precipitated silica or amorphous silica (CAS No.: 11 2945-52-5) in different forms were applied to rabbits and no eye irritation was reported, as well as reports of mild conjunctivitis, mild to moderate conjunctival redness, and corneal opacity, but all symptoms were reporte d to be recoverable. However, all symptoms were reported to be recover able (SIDS (2006), ECETOC JACC (2006)).

(Sodium hydroxide) : A 1.2% solution or a concentration of 2% or higher is described as corr osive to rabbit eyes (SIDS (2009)), and the pH is 12 (0.05% w/w) (Merc k (14th, 2006)). There have been numerous reports of human accidents i nvolving severe eye damage due to high concentrations of dust or soluti on (ACGIH (7th, 2001)) and accidental eye contact resulting in blindness (DFGOT vol. 12 (1999)). It is also corrosive to skin and is classified as C and R35 in the EU classification.

RESPIRATORY OR SKIN SENSITIZATION

: No data available.

SKIN SENSITIZATION :

(Sodium hydroxide) : In a skin sensitization study by male volunteers, a 0.063% - 1.0% solution was applied to the back for induction, and 7 days later a 0.125% solution was reapplied. There was a dose-dependent enhancement of irritation, but no enhancement of reaction on the reapplied patch surface. Thus, sodium hydroxide was not a skin sensitizer. Furthermore, sodium hydroxide has been widely used for many years, and there have been no reported cases of skin sensitization in humans, leading to the conclusion that sodium hydroxide is not considered a skin sensitizer (SIDS (2009)).

GERM CELL MUTAGENICITY :

(silica gel) : In vivo, negative in a dominant lethal test in rats by oral administration and a chromosomal aberration test in rat bone marrow cells by oral adm inistration (ECETOC JACC (2006), SIDS (2006)); in vitro, negative in a b acterial reverse mutation test, a gene mutation test in mammalian culture d cells, and a chromosomal aberration test in mammalian cultured cells (ECETOC JACC (2006), SIDS (2006)). In vitro, it is negative in bacterial reverse mutation test, gene mutation test, and chromosomal aberration te st, and weakly positive in micronucleus test of cultured mammalian cells (ECETOC JACC (2006), SIDS (2006)).

(sodium hydroxide) : As in vivo data, no significant increase in micronuclei was observed in the micronucleus test using bone marrow cells administered intraperitoneally to mice (somatic cell in vivo mutagenicity test) (SIDS (2009)) and in the chromosome aneuploidy induction test using oocytes administered intraperitoneally to mice (In a germ cell in vivo mutagenicity study using oocytes injected intraperitoneally into mice (SIDS(2009)), no evidence of chromosome disjunction was found (SIDS(2009)). As for in vitro mutagenicity testing, negative results in the Ames test (SIDS(2009)) and false positive results in the chromosome aberration test using CHO K1 cells (SIDS(2009)) have been reported.

CARCINOGENICITY :

(silica gel) : The substance group indicated by this CAS number is silica (SiO2) and i ncludes all forms of silica (ECETOC JACC No. 51 (2006)). This substanc e group includes crystalline silica and its carcinogenicity classification res ult is considered applicable.

(sodium hydroxide) : Negative in a 12-week oral carcinogenicity study in rats (DFGOT vol. 12 (1999)).

REPRODUCTIVE TOXICITY : No data available.

SPECIFIC TARGET ORGAN TOXICITY-Single exposure

:

(Silica gel) : Silica gel (CAS No.: 112926-00-8) is reported to be an airway irritant (SI DS (2006), ECETOC JACC (2006)).

(sodium hydroxide) : Acute inhalation exposure to dust or mist may cause irritation of mucous membranes, followed by coughing and dyspnea, and if exposure is more severe, pulmonary edema and shock may result (PATTY (5th, 2001)). So me authors also state that dust formation is unlikely due to physicochemi cal properties such as deliquescence and minimal vapor pressure (SIDS (2009)). Other reports include 28 cases of accidental ingestion in which 50-200 mL of an estimated 25-37% solution caused injuries to the upper gastrointestinal tract and esophagus (SIDS (2009)), and numerous reports of serious (accidental ingestion) accidents and suicides causing severe corrosion from the oral cavity to the esophagus (DFGOT vol. 12 (1999).

(Aluminum oxide) : Upper respiratory tract irritation (ICSC (2000)).

SPECIFIC TARGET ORGAN TOXICITY-Repeated exposure

:

(Silica gel) : In humans, silicosis has been reported with quartz and cristobalite. In addition, fibrogenicity has been reported in experimental animals with quartz and cristobalite. In addition, autoimmune disease, chronic renal disease and asymptomatic renal degeneration have been reported with quartz, and regression fever such as metal fume fever with fused silica (ACGIH (7th, 2006)).

(Sodium hydroxide) : Described as having no animal study data on repeated exposure by oral, dermal, inhalation or other routes (SIDS (2009)), and little data on effects on humans, so cannot classify due to lack of data. In addition, there is a description (ACGIH(7th, 2001)) that repeated aerosol inhalation exposure in rats caused lung damage, but the exposure concentration is unknown. It is stated that dust formation is unlikely due to physicochemical properties such as deliquescence and minimal vapor pressure (SIDS(2009)).

(Aluminum oxide) : Occupational exposure to aluminum oxide has been reported to cause adenopathy in the lungs (EHC(1997)).

ASPIRATION TOXICITY : No data available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY : No data available

BIODEGRADABILITY : No data available

BIOACCUMULATIVE POTENTIAL : No data available

MOBILITY IN SOIL : No data available

HAZARDOUS TO THE OZONE LAYER

: Not listed in Montreal Protocol list.

13. DISPOSAL INFORMATION

Dispose in a hazardous-waste site in accordance with all applicable regulations. Any disposal practice must be in compliance with country, local, state, and federal laws and regulations (contact country, local or state environment agency for specific rules).

14. TRANSPORT INFORMATION

International Regulations

Maritime regulations : Conform to the provisions of IMO.

UN No. : 1823

Proper Shipping Name : SODIUM HYDROXIDE, SOLID

Class : 8

Packing Group : II

Marine Pollutant : Not applicable

Aviation regulations : Conform to the provisions of ICAO/IATA.

UN No. : 1823

Proper Shipping Name : Sodium Hydroxide, Solid

Class : 8

Packing Group : II

Emergency Response Guideline No.

: 154

15. REGULATORY INFORMATION

For classification and labeling of chemicals in accordance with the applicable rules and regulations in the EU or each country, refer to GHS classification of this product (See Section 2).

US REGULATION : OSHA HCS 2012/29 CFR 1910.1200

EU REGULATION : CLP Regulation ((EC) No. 1272/2008)

16. OTHER INFORMATION

NOTICE:

The information contained in the SDS description is applicable exclusively to the chemical substance identified herein and for its intended use as an analytical reference standard or reagent and to the unit quantity intended for that purpose. The information does not relate to, and may not be appropriate for, any application or larger quantity of the substance described. Our products are intended for the use by individuals possessing sufficient technical skill and qualification on use the material potential hazardous chemical. Accordingly, no representation or warranty, express or implied, with respect to merchantability and fitness for a particular purpose is made with respect to the information contained herein.

Attention:

This product in terms of chemical identity and the unit amount provide is intended for use in chemical analysis and not for human consumption, nor any other purpose.