SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME	:	4 Layer cleanup cartridge
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.	:	1050-24031, 1050-
SDS No.	:	1050-24031

Research use only.

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION :

Acute toxicity - inhalation -	:	Category 2
Skin corrosion/irritation	:	Category 1A
Serious eye damage/eye irritation	:	Category 1
Specific target organ toxicity (Single exposure)	:	Category 1 (respiratory organs)
Specific target organ toxicity (Repeated exposure)	:	Category 1 (respiratory organs)
Hazardous to the aquatic environment, short-term (acute)	:	Category 1
Hazardous to the aquatic environment, long-term (chronic)	:	Category 1

LABEL ELEMENTS

HAZARD SYMBOL :

SIGNAL WORD : Danger

HAZARD STATEMENTS :

H330	Fatal if inhaled
H314	Cause severe skin burns and eye damage
H370	Cause damage to organs (respiratory organs)
H372	Cause damage to organs through prolonged or repeated exposure (respiratory organs)
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS :

[Prevention]

P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	[In case of inadequate ventilation] wear respiratory protection.

[Response]

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.
P304+P340	IF INHALED: Remove person to fresh air and keep 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.
P308+P311	IF exposed or concerned: Call a POISON CENTER or doctor.

P310 Immediately call a POISON CENTER or doctor.
P314 Get medical attention if you feel unwell.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.
[Storage]
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
[Disposal]
P501 Dispose of contents/container in accordance with all applicable regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE / MIXTURE : Mixture
COMMON CHEMICAL NAME : 4 Layer cleanup cartridge
SYNONYMS : - - -

CHEMICAL NAME	CONTENT	CHEMICAL FORMULA	CAS RN.	TSCA INVENTRY	EINECS No.
Silica gel	57 %	SiO_2	7631-86-9	Listed	231-545-4
Sulfuric acid	15 %	H_2SO_4	7664-93-9	Listed	231-639-5
Silver Nitrate	1.3 %	$AgNO_3$	7761-88-8	Listed	231-853-9
Potassium hydroxide	0.3 %	KOH	1310-58-3	Listed	215-181-3
Sodium sulfate, anhydrous	26.4 %	Na_2SO_4	7757-82-6	Listed	231-820-9

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

8. EXPOSURE CONTROL/PERSONAL PROTECTION

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

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

CONTROL PARAMETERS

CONTENT	ACGIH TLV	OSHA PEL	NIOSH REL
Silica gel	3mg/m^3 (as other respirable dust)	80 mg/m^3/%SiO(2)+2 (as amorphous silica)	6 mg/m^3 (as amorphous silica)
Sulfuric acid	1mg/m^3	0.2mg/m^3	1mg/m^3
Silver Nitrate	0.01mg/m^3(as Ag)	0.01mg/m^3(as Ag)	0.01mg/m^3(as Ag)
Potassium hydroxide	2mg/m^3	Not established	2mg/m^3

PERSONAL PROTECTION

RESPRATORY PROTECTION : Safety mask

HAND PROTECTION : Chemical resistant gloves

EYE PROTECTION : Safety glasses(goggles)

SKIN PROTECTION : Protective clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE : Solid (powder)

COLOUR : white to light white grayish (Silver nitrate-impregnated silica gel)
white to light yellowish (Sulfuric acid-impregnated silica gel, potassium hydroxide silica gel)

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 : Strong acid (Sulfuric acid-impregnated silica gel in aquatic solution), strong base (Potassium hydroxide silica gel in aquatic solution)

KINEMATIC VISCOSITY : Not applicable

SOLUBILITY : 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 : Not applicable

PARTICLE CHARACTERISTICS : Not applicable

10. STABILITY AND REACTIVITY

REACTIVITY : It is easy to absorb moisture in the air, and carbon dioxide.

CHEMICAL STABILITY : Stable under recommended storage conditions.

CONDITION TO AVOID : Sunlight, heat, moisture, CO_2, oxidizers, acids

INCOMPATIBLE MATERIALS : Strong oxidizers and strong acids

HAZARDOUS DECOMPOSITION PRODUCTS
: NOx、SOx

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Oral) : Since the toxicity unknown component is 0.1% or more, it cannot be classified.

ACUTE TOXICITY (Dermal) : No data available

ACUTE TOXICITY (Inhalation) : No data available

SKIN CORROSION/IRRITATION : Since sulfuric acid is 15% ≥ 1%, it corresponds to Category 1A.

EYE DAMAGE/EYE IRRITATION : Since sulfuric acid is 15% ≥ 1%, it corresponds to Category 1A.

RESPIRATORY SENSITIZATION : No data available

(Sulfuric acid) : A description of serious eye damage with dissolution of the anterior chamber of the eye was observed in human accidents (ATSDR, 1998), moderate with 5% solution to rabbit eyes, 10%. There is a description that strong irritation was observed in the liquid (SIDS, 2001) and the pH of this substance is 2 or less.

SKIN SENSITIZATION : No data available

GERM CELL MUTAGENICITY : Since the toxicity unknown component is 0.1% or more, it cannot be classified.

(Sulfuric acid) : There are no test data on the skin sensitization of sulfuric acid. Sulfuric acid has been used industrially for decades, and while skin disorders due to skin irritation are well known, there are no case reports of skin sensitization. A large amount of sulfate ions are present in the body (sulfate ions in serum are ~ 33 mmol / L, 50 times that in cells), but allergic reactions do not occur. In the metal sulfate allergy test, it is presumed from the negative result of zinc sulfate that it may be allergic positive due to metal but negative for sulfate ion. From the above results, it can be concluded that sulfuric acid is not allergic to humans (SIDS, 1998).

CARCINOGENICITY : No data available

(Sulfuric acid) : In vivo, there are no test data using germ cells or somatic cells, and in vitro mutagenicity tests show positive results only in a single-index (chromosomal aberration test) test system (ATSDR, 1998). Other indicators are negative.

(Potassium hydroxide) : There are no in vivo data on this substance, and in vitro, it is negative in the bacterial reversion mutation test and the chromosomal aberration test in cultured mammalian cells (SIDS (2004)). SIDS (2004) provides comprehensive information on this substance, sodium hydroxide (CAS No. 1310-73-2), potassium chloride (CAS No. 7447-40-7), and potassium carbonate (CAS No. 584-08-7). We are evaluating the mutagenicity from. That is, sodium hydroxide has a negative result in the small nucleus test of mouse bone marrow cells and the chromosomal aberration test of mouse egg mother cells in vivo (SIDS (2004)), and in vitro, the high pH in the medium of the test substance and Except for the effects of osmotic pressure artifacts, sodium hydroxide, potassium chloride, and potassium carbonate are bacterial reversion mutation tests, potassium chloride is a mouse phosphorformer test of cultured mammalian cells, and potassium carbonate is a chromosomal abnormality in cultured mammalian cells. All tests are negative (SIDS (2004)). Based on the above, SIDS (2004) indicates that these substances are not considered to be genotoxic.

REPRODUCTIVE TOXICITY : No data available

(Sulfuric acid) : Occupational exposure of inorganic strong acids, including sulfuric acid, to mist is classified as Group 1 by IARC (1992), A2 by ACGIH (2004), and K by NTP (2005). Respecting NTP evaluation, it is classified as Category 1. However, sulfuric acid itself is classified into category 4 by DFGOT (vol.15, 2001), and neither institution classifies it as carcinogenic.

SPECIFIC TARGET ORGAN TOXICITY -Single exposure-
: Since sulfuric acid is 15% ≥ 10%, it corresponds to Category 1 (respiratory system).

(Sulfuric acid) : Airway irritation symptoms such as cough and shortness of breath have been observed with low-dose inhalation exposure in humans (DFGOT, 2001), and acute effects such as cough, shortness of breath and blood sputum excretion with high-dose exposure, as well as decreased lung function and A statement that permanent effects such as fibrosis and emphysema were observed (ATSDR, 1998) and that pulmonary bleeding and dysfunction were observed after 8-hour inhalation exposure in guinea pigs (ATSDR, 1998).

(Silver nitrate) : This substance is corrosive and airway irritant (ATSDR (1990), PATTY (6 th, 2012)). In humans, airway mucosa irritation due to inhaled dust expo sure and oral acute poisoning symptoms include burning sensation and p ain in the mouth, salivation, vomiting, abdominal pain, diarrhea, severe g astroenteritis, decreased blood pressure, decreased respiratory rate, and dizziness. , Convulsions, medial muscle paralysis, coma, central nervous system disorders, and death have been reported (HSDB (Access on Sept ember 2014)). There are no experimental animal data.

SPECIFIC TARGET ORGAN TOXICITY -Repeated exposure-

: Since sulfuric acid is 15% ≥ 10%, it corresponds to Category 1 (respiratory system).

(Sulfuric acid) : In the 28-day inhalation exposure test in rats of SIDS (2001), cell proliferation was observed in the laryngeal mucosa within the guidance value range of Category 1, and in the 14-139-day repeated inhalation exposure test in guinea pigs of ATSDR (1998), Category 1 Airway and lung disorders such as nasal septal edema, pulmonary emphysema, aerobic lung, bronchiolar congestion, edema, bleeding, thrombosis, and lung fineness in a 78-week inhalation exposure study in cynomolgus monkeys at concentrations within the guidance range. Histological changes such as cell hyperplasia in the bronchioles and wall thickening were observed at doses (0.048 mg / L, 23.5 Hr / Day) within the guidance value range of Category 1.

(Silver nitrate) : At a silver nitrate and silver oxide manufacturing plant, 25 out of 30 wor kers who have been exposed to silver dust for less than 1 year to more than 10 years have upper respiratory tract irritation (sneezing, runny no se, stuffy nose, sore throat). , The same 10 people reportedly complaine d of abdominal pain (severe pain reduced by antioxidants) (ATSDR (199 0), ACGIH (7th, 2001)). Of these, abdominal pain may be due to mucos al irritation caused by oral ingestion of part of the dust, and in a small number of symptoms (1/3 of the total), other gastrointestinal symptoms s uch as diarrhea and vomiting are also described. It was thought that it s hould not be the target of the target organ.

On the other hand, in experimental animals, in a test in which 222 mg Ag / kg / day (equivalent to 349.6 mg / kg / day) of this substance was administered to rats by drinking water for 37 weeks, an increase in mortality was observed after 23 weeks, but in the eyes There is no description of organ toxicity other than silver disease (ACGIH (7th, 2001)), and in a study in which 89 mg Ag / kg / day (equivalent to 140 mg / kg / day) was administered to rats by drinking water for 9 months, left Although there is a description that ventricular hypertrophy was observed (ATSDR (1990), ACGIH (7th, 2001)), the effects on the cardiovascular system have not been reported in human and other animal studies, and this result is reliable. It is said that there is no such thing (ATSDR (1990)). In addition, there are no data available for classification in laboratory animals.

ASPIRATION TOXICITY : Since the kinematic viscosity is unknown, it cannot be classified.

(Potassium hydroxide) : Death cases in which this substance was orally ingested for unintentional or suicide purposes, including a description that some of the causes of death include aspiration from the esophagus to the trachea and pneumonia (ACGIH (7th, 2001)), and the alkaline respiratory tract. There is a description that aspiration to the larynx causes fatal injury to the pharynx, trachea / bronchi, and lungs (SIDS (2004)).

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment -Acute hazard-

: Category 1 x Toxicity multiplier is 130.0%, which corresponds to Category 1 because it is above the concentration limit (25%).

(Sulfuric acid) : Fish (bluegill) 96 hours LC50 (pH 3.25-3.5) = 16-28 mg / L (OECD SID S: 2001).

(Silver nitrate) : 48 hours EC50 = 0.0014 mg / L (0.0009 mg Ag / L) (CICADs 44, 2002) by crustaceans (Daphnia magna).

Hazardous to the aquatic environment -Chronic hazard-

: Category 1 x Toxicity multiplier is 145.0%, which corresponds to Category 1 because it is above the concentration limit (25%).

(Sulfuric acid) : Using chronic toxicity data, the mediopassive voice of inorganic compoun ds in the environment is unknown, but the 45-day NOEC (growth) (pH 6. 0) = 0.025 mg / L (OECD SIDS: 2001) for fish (mosquitofish). Since mo squitofish are ovoviviparous, the results cannot be used for classification, but they have a large effect on the growth of the target substance and are expected to have the same or higher toxicity in other fish species.

When acute toxicity data are used for nutritional stages for which chronic toxicity data are not available, the environmental kinetics of inorganic co mpounds are unknown, but 24-hour LC50 = 29 mg / L (OECD SIDS) for crustaceans (Daphnia magna). : 2001).

(Silver nitrate) : When using chronic toxicity data, the environmental dynamics of inorgani c compounds are unknown, and 60-day LOEC = 0.00016 mg / L (CICAD s 44, 2002) for fish (rainbow trout).

When acute toxicity data are used for nutritional stages for which chronic toxicity data are not available, the environmental kinetics of inorganic compounds is unknown, and 48 hours EC50 = 0.0014 mg / L (0.0009 mg) of crustaceans (Daphnia magna). Ag / L) (CICADs 44, 2002).

BIODEGRADABILITY : No data available.

BIOACCUMULATIVE POTENTIAL : No data available

MOBILITY IN SOIL : No data available

Hazardous to the ozone layer : This substance is not listed in Annexes to the Montreal Protocol.

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

Marine regulatory information : Comply the provisions of IMO.

UN Number : 2923

Proper Shipping Name : CORROSIVE SOLID, TOXIC, N.O.S.

Class : 8

Sub Risk : 6.1

Packing Group : II

Marine Pollutant : Not applicable

Aviation regulatory information : Comply the previsions of ICAO/IATA.

UN Number : 2923

Proper Shipping Name : CORROSIVE SOLID, TOXIC, N.O.S.

Class : 8

Sub Risk : 6.1

Packing Group : II

Emergency Response Guide Number : 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.