SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME	:	VOC21 Mixture in Methanol, each 2500ppm
NAME OF MANUFACTURER	:	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.	:	1021-58513
SDS No.	:	1021-58513

Research use only.

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION :

Flammable liquid	:	Category 2
Acute toxicity - oral -	:	Category 4
Eye damage/irritation	:	Category 2
Germ cell mutagenicity	:	Category 2
Carcinogenicity	:	Category 1
Reproductive toxicity	:	Category 1
Reproductive toxicity	:	effects on or via lactation
Specific target organ toxicity (Single exposure)	:	Category 1(Central nervous system, optic organ, systemic toxicity)
Specific target organ toxicity (Single exposure)	:	Category 2(Liver, kidneys, respiratory system)
Specific target organ toxicity (Single exposure)	:	Category 3(anesthesia)
Specific target organ toxicity (Repeated exposure)	:	Category 1(central nervous system, optic organ)
Specific target organ toxicity (Repeated exposure)	:	Category 2(Liver, kidneys, respiratory system)
Hazardous to the aquatic environment - Acute hazard	:	Category 3
Hazardous to the aquatic environment - Chronic hazard	:	Category 3
Hazardous to the Ozone layer	:	Category 1

HAZARD SYMBOL :

SIGNAL WORD : Danger

HAZARD STATEMENTS :

H225	Highly flammable liquid and vapour
H302	Harmful if swallowed
H319	Cause serious eye irritation
H341	Suspected of causing genetic defects
H350	May cause cancer
H360	May damage fertility or the unborn child
H362	May cause harm to breast-fed children
H370	Cause damage to organs
H371	May cause damage to organs
H336	May cause drowsiness or dizziness
H372	Cause damage to organs through prolonged or repeated exposure

H373	May cause damage to organs through prolonged or repeated exposure
H402	Harmful to aquatic life
H412	Harmful to aquatic life with long lasting effects
H420	Harms public health and the environment by destroying ozone in the upper atmosphere

PRECAUTIONARY STATEMENTS :

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. –No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P260	Do not breathe fume/gas/mist/vapours.
P263	Avoid contact during pregnancy and while nursing.
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.
P303+P361+ P353	IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378	In case of fire: Use appropriate media such as chemical powder or carbon dioxide to extinguish.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
P330	Rinse mouth.
P305+ P351+ P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical attention.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314	Get medical attention if you feel unwell.
P403+ P233+P235	Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405	Store locked up.
P501	Dispose of contents/container in accordance with all applicable regulations.
P502	Refer to manufacturer or supplier for information on recovery or recycling

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL IDENTITY	CONTENT	CHEMICAL FORMULA	CAS No.	TSCA INVENTRY	EINECS No.	EC INDEX No.
Methanol	94.5 %	CH_3OH	67-56-1	Listed	200-659-6	603-001-00-X
1,1-Dichloroethylene	0.25 %	$CCl_2=CH_2$	75-35-4	Listed	200-864-0	602-025-00-8
Dichloromethane	0.25 %	CH_2Cl_2	75-09-2	Listed	200-838-9	602-004-00-3
tert-Buthyl methyl ether	0.25 %	$(CH_3)_3COCH_3$	1634-04-4	Listed	216-653-1	603-181-00-X
trans-1,2-Dichloroethylene	0.25 %	CHCl=CHCl	156-60-5	Listed	205-860-2	—
cis-1,2-Dichloroethylene	0.25 %	CHCl=CHCl	156-59-2	Listed	205-859-7	—
Chloroform	0.25 %	$CHCl_3$	67-66-3	Listed	200-663-8	602-006-00-4
1,1,1-Trichloroethane	0.25 %	CH_3CCl_3	71-55-6	Listed	200-756-3	602-013-00-2
Tetrachloromethane	0.25 %	CCl_4	56-23-5	Listed	200-262-8	602-008-00-5
1,2-Dichloroethane	0.25 %	CH_2ClCH_2Cl	107-06-2	Listed	203-458-1	602-012-00-7
Benzene	0.25 %	C_6H_6	71-43-2	Listed	200-753-7	601-020-00-8
Trichloroethylene	0.25 %	$CHCl=CCl_2$	79-01-6	Listed	201-167-4	602-027-00-9
Bromodichloromethane	0.25 %	$CHBrCl_2$	75-27-4	Listed	200-856-7	—
cis-1,3-Dichloropropene	0.25 %	$ClCH_2CH=CHCl$	10061-01-5	Not Listed	233-195-8	—
Toluene	0.25 %	$C_6H_5CH_3$	108-88-3	Listed	203-625-9	601-021-00-3
trans-1,3-Dichloropropene	0.25 %	$ClCH_2CH=CHCl$	10061-02-6	Not Listed	—	—
1,1,2-Trichloroethane	0.25 %	$ClCH_2CHCl_2$	79-00-5	Listed	201-166-9	602-014-00-8
Tetrachloroethylene	0.25 %	$Cl_2C=CCl_2$	127-18-4	Listed	204-825-9	602-028-00-4
Dibromochloromethane	0.25 %	$CHBr_2Cl$	124-48-1	Listed	204-704-0	—
o-Xylene	0.25 %	$C_6H_4(CH_3)_2$	95-47-6	Listed	202-422-2	601-022-00-9
m-Xylene	0.25 %	$C_6H_4(CH_3)_2$	108-38-3	Listed	203-576-3	601-022-00-9
p-Xylene	0.25 %	$C_6H_4(CH_3)_2$	106-42-3	Listed	203-396-5	601-022-00-9
Bromoform	0.25 %	$CHBr_3$	75-25-2	Listed	200-854-6	602-007-00-X

4. FIRST AID MEASURES

GENERAL ADVICE : Consult a physician. Show this safety data sheet to the doctor in attendance.

INHALATION : Move victim to fresh air. 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. Consult a physician immediately.

EYE CONTACT : 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 possible, remove any contact lenses. Consult a physician immediately.

INGESTION : Rinse mouth, give plenty of water to dilute the substance. Do not induce vomiting. Never give anything by mouth to an unconscious person. Consult a physician immediately.

MOST IMPORTANT SYMPTOMS AND EFFECTS

: May irritate to skin, eyes, respiratory systems.
May induce Unconsciousness, blindness, death and headache.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA : Water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

FIRE & EXPLOSION HAZARDS : Toxic, irritating, dust/fume/smoke may be emitted. Carbon monoxide may be foamed.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS

: Firemen 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.

ENVIROMENTAL PRECATIONS : Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

METHODS FOR CLEAN UP : Do not touch spilled material without suitable protection. Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

HANDLING : Keep away from ignition sources and ventilate the area －No smoking. In case of insufficient ventilation, wear suitable respiratory equipment.

Avoid contact with eyes, skin, and clothing. Avoid inhalation of vapour or mist. Avoid prolonged or repeated exposure. Handle this product with suitable protection.

STORAGE : Store away from sunlight, heat and all ignition sources in well-ventilated dry place. Keep container tightly closed. Keep cool(2 ~ 10℃).

INCOMOPATIBLE PRODUCTS : 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) ; Necessary

CONTROL PARAMETERS

	ACGIH	OSHA PEL	NIOSH REL
Methanol	200 ppm		
1,1-Dichloroethylene	5 ppm	－	－
Dichloromethane	50 ppm	25 ppm	－
tert-Buthyl methyl ether	50 ppm	－	－
trans-1,2-Dichloroethylene	Not established		
cis-1,2-Dichloroethylene			
Chloroform	10 ppm	C 50 ppm	Ca ST 2ppm
1,1,1-Trichloroethane	350 ppm		
Tetrachloromethane	5 ppm	10 ppm	ST 2 ppm
1,2-Dichloroethane	10 ppm	50 ppm	Ca 1 ppm
Benzene	0.5 ppm	1 ppm	0.1 ppm
Trichloroethylene	10 ppm	10 ppm	－
Bromodichloromethane	Not established		
cis-1,3-Dichloropropene			
Toluene	50 ppm	TWA 200 ppm	TWA 100 ppm
trans-1,3-Dichloropropene	Not established		
1,1,2-Trichloroethane	10 ppm		
Tetrachloroethylene	25 ppm	200 ppm	－
Dibromochloroethane	Not established		
o-Xylene	100 ppm		
m-Xylene			
p-Xylene			
Bromoform	0.5 ppm		

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

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	:	Colorless, clear liquid
ODOR	:	Characteristic odor
pH	:	No data available
BOILING POINT	:	approx.64 °C(Methanol)
MELTING POINT	:	-98 °C(Methanol)
FLASH POINT	:	11 °C (TCC)(Methanol)
EXPLOSIVE LIMITS	:	6.0% (lower), 35.6 % (upper)(Methanol)
VAPOR PRESSURE	:	12.3 kPa (at 20°C)(Methanol)
VAPOR DENSITY	:	1.11(Methanol)
SPECIFIC GRAVITY	:	0.729 g/cm^3 (at 20/4°C)(Methanol)
SOLUBILITY IN		
Water	:	Miscible
Organic solvent	:	Miscible
PARTITION COEFFICIENT ; n-octanol/water		
	:	log Pow: -0.82/-0.66(Methanol)
AUTOIGNITION TEMPERATURE	:	464 °C(Methanol)
DECOMPOSITION TEMPERATURE		
	:	No data available

10. STABILITY AND REACTIVITY

REACTIVITY	:	Stable under recommended storage conditions.
CHEMICAL STABILITY	:	Deteriorated by sun-light.
CONDITION TO AVOID	:	Sunlight, heat, open flames, high temperature, sparks, static electrical charge, other ignition sources, moisture
INCOMPATIBILE MATERIALS	:	Oxidizers and strong acids
HAZARDOUS DECOMPOSITION PRODUCTS		
	:	CO, CO_2,Cl, HCl may be formed.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY -oral-	:	This mixture is classified in category 4. LD50=1,411 mg/kg(calculated value)
(Methanol)	:	Acute toxicity of Methanol affects primates stronger than rodents(EHC 196,1997). rat; LD50=6200mg/kg, 9100mg/kg(EHC 196,1997).
SKIN CORROSION/IRRITATION	:	Methanol is Not classified.
EYE DAMAGE/EYE IRRITATION	:	This mixture is classified in category 2.
(Methanol)	:	Draize score; 2.1(average), 2.00(4hr), 0.50(72hr)(EHC 196,1997)
(Chloroform)	:	Strongly irritating to rabbit. (EHC 163,1994)
SENSITIZATION	:	All compound is not classified.
GERM CELL MUTAGENICITY	:	This mixture is classified in Category 2.
(1,2-Dichloroethane)	:	Human Lymphocyte micronucleus test (CERI/NITE hazard assessment report No.3,2004)
CARCINOGENICITY	:	This mixture is classified in category 1.
(Benzene)	:	K(NTP,2005), 1(IARC,1987), A1(ACGIH,2001), A(EPA,2000)
(Trichloroethylene)	:	2A(IARC), R(NTP,2005)
(Tetrachloroethylene)	:	2A(IARC vol.63,1995), R(NTP RoC,11th,2005)
REPRODUCTIVE TOXICITY	:	5 components are classified in category 1. 2 components are classified in effects on or via lactation
(Methanol)	:	Methanol has a potential impact on human development(NTP-CHRHR Monograph,2003).
(Trichloroethylene)	:	Effect to fetal behavioral changes (CERI/NITE hazard assessment report,2003).
(Toluene)	:	Human: fetal alcohol syndrome(IARC 71,1999)
(Tetrachloroethylene)	:	Detect from human breast milk and parents blood(IARC vol.63,1995).
(p-Xylene)	:	Teratogenesis assay: Positive(CERI/NITE,2004)
(p-Dichlorobenzene)	:	Reproductive toxicity assay: Positive.(OECDTG416, EU-RARNo.48(2004))

SPECIFIC TARGET ORGAN TOXICITY - single exposure -
: This mixture is classified in all category of this hazard.

(Methanol) : Central nervous depression (acute toxicity), metabolic acidosis, visual defect, blindness, headache, dizziness, vomiting, narcosis, death(DFGOT vol.16,2001).

(1,1-Dichloroethylene) : Effect to central nervous system (CERI/NITE hazard assessment report No.48,2005)

(Dichloromethane) : Effect to nervous system, optic organs, lungs and cerebral infraction (CERI/NITE hazard assessment report No.15,2004)

(Chloroform) : Effect to liver, kidneys and nervous system (CERI/NITE hazard assessment report No.16,2005)

(Tetrachloromethane) : Effect to liver, kidneys and nervous system (CERI/NITE hazard assessment report,2006)

(1,2-Dichloroethane) : Effect to liver, kidneys, nervous system and respiratory tract (CERI/NITE hazard assessment report No.3,2004)

(1,1,2-Trichloroethane) : Respiratory irritating (CERI/NITE hazard assessment report No.12,2004)

(Tetrachloroethane) : Effect to liver, kidneys (CERI/NITE hazard assessment report 65,2006)

(Tribromomethane) : Effect to liver, central nervous system and lungs (CERI/NITE hazard assessment report No.38,2004)

SPECIFIC TARGET ORGAN TOXICITY - repeated exposure -
: This mixture is classified in Category 1 and 2.

(Methanol) : disorder of the eye, blindness(EHC 196(1997), ACGIH(7th,2001)).

(1,1-Dichloroethylene) : Effect to liver (CERI/NITE hazard assessment report No.48,2005)

(Dichloromethane) : Effect to nervous system and cerebral infraction (CERI/NITE hazard assessment report No.15(2004), HSDB(2000))

(Chloroform) : Effect to liver, kidneys and nervous system (CERI/NITE hazard assessment report No.16,2005)

(Tetrachloromethane) : Effect to liver (CERI/NITE hazard assessment report)

(1,2-Dichloroethane) : Effect to liver, kidneys, nervous system and respiratory tract (CERI/NITE hazard assessment report No.3,2004)

(1,1,2-Trichloroethane) : Effect to central nervous system, kidneys and lungs (CERI/NITE hazard assessment report No.12,2004)

(Tetrachloroethane) : Effect to liver, lungs and kidneys (CERI/NITE hazard assessment report,2005)

ASPIRATION HAZARD : Classification not possible.

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment
: This mixture is classified in category 3.

(Tetrachloromethane) : Pseudokirchneriel lasubcapitata: ErC50=0.46mg/L/72h(Eco-toxicity tests, Ministry of the Environment in Japan, 2002)

(Tetrachloroethylene) : Daphinia magna: EC50=0.602mg/L/48h(NITE hazard assessment report,2006)

(o-Xylene) : Selenastrum: LC50=0.8mg/L/72h(Eco-toxicity tests, Ministry of the Environment in Japan, 1996)

(p-Dichlorobenzene) : Ceriodaphnia dubia: EC50=0.7mg/L/48hr(NITE,2005)

EFFECT TO OZONE LAYER : Tetrachloromethane and 1,1,1-Trichloroethane are listed in Montreal Protocol list, Annex B.

BIODEGRADABILITY : Some components are poor water-solubility and have no rapid degradability.

BIOACCUMULATIVE POTENTIAL : Some components have bio accumulative potential.

MOBILITY IN SOIL : No data available

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

IATA

UN NUMBER : 1986

UN PROPER SHIPPING NAME : Alcohols, Flammable, Toxic, N.O.S (Methanol solution)

CLASS : 3, flammable liquid (6.1, toxic substances)

PACKING GROUP : II

ADR/RID : 1986, Alcohols, Flammable, Toxic, N.O.S

DOT : 1986, Alcohols, Flammable, Toxic, N.O.S

MARINE POLLUTANT : No

15. REGULATORY INFORMATION

US REGULATIONS : Labeling according to EC Directives; See section 2

EU REGURATIONS : Labeling according to EC Directives; See section 2

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.