GUIDELINES FOR THE FORMULATION OF A CHEMICAL SAFETY DATA SHEET

DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH
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Preface

These guidelines may be cited as the Guidelines for the Formulation of a Chemical Safety Data Sheet for a Hazardous Chemical.

The purpose of these guidelines is to supplement the requirements of Regulation 9 of the Occupational Safety and Health (Classification, Packaging and Labelling) Regulations 1997 [P.U. (A) 143] with respect to the duty of a supplier to furnish an up-to-date Chemical Safety Data Sheet (CSDS) for each hazardous chemical supplied. The contents of these guidelines are intended to clarify and elaborate on the information stipulated in the regulations which need to be furnished by the supplier in the CSDS. A supplier, however, may choose to interpret the requirement of the regulations differently but he must first show to the Director General of Occupational Safety and Health that his interpretation is on a par with that given in these guidelines. Otherwise the supplier is advised to use these guidelines to formulate for the CSDS.

The supplier is also advised to read these guidelines in conjunction with the Guidelines for the Classification of Hazardous Chemicals which have been prepared to assist suppliers to perform their duties stipulated under the regulations.

These guidelines will be reviewed from time to time and supplier are encouraged to give their comments and in writing to the Department of Occupational Safety And Health so that the guidelines will become more comprehensive and cost effective.

Director General
Department of Occupational Safety and Health
Malaysia.

December 1997

Glossary

Acute effect

An effect that occurs immediately or shortly after a single exposure.

Ames test

A screening test using strains of bacteria in an attempt to determine whether a chemical has mutagenic effects.

Antidote

A treatment for chemical over-exposure which is specific (more or less) to the chemical or class of chemicals; in contrast to supportive treatment which maintains body functions.

Asphyxia

Suffocation

Asphyxiant

A substance which causes suffocation.

Auto ignition temperature

The minimum temperature required to start or cause self-sustained combustion in any substances in the absence of a high temperature ignition source, such as a spark or flame. This is not applicable to many substances.

Birth Defects

Abnormalities or anomalies present at birth either caused by naturally occurring factors or tetatogens (see teratogenesis).

Boiling Point

The temperature of a liquid at which the vapour pressure is equal to or slightly greater than the ambient atmospheric pressure.

Cancer

A malignant tumour which can spread to other organs of the body, as distinct from a begin tumour which cannot.
[Although leukaemia and some other malignant diseases are not solid tumuors, they meet other criteria for cancer and can be (and often are) included under this definition.]

Carcinogen

An agent which is responsible for the formation of a cancer.

Carcinogenic

Means substances or preparations which if inhaled or ingested or penetrated into the skin, may induce cancer in human or increase its incidence.

Chemical Abstracts Service (CAS) Number

A number assigned to a single chemical by the Chemical Abstracts Service (a US-based references service) which serves to identify that chemical. Some mixtures (not many) are also assigned a CAS number. This is the only 'one chemicals one number' system covering all publicly know chemicals.

Chemical Safety Data Sheet

A document that describes the properties and uses of a chemical product or formulation including identify, chemical and physical properties, health hazard information, precaution for use; and safe handling information etc.

Chronic effects

Harmful effects of a chemical which occur after repeated or prolonged exposure. Chronic effects may also occur some time after exposure has ceased.

Commercially confidential

When disclosure of confidential information (such as chemical identify or exact composition) would significantly damage genuine commercial interests.

Corrosive

A chemical which cause destruction of or damage to materials or living tissue on contact.

Density

Ratio of the mass of a substance to its volume.

Dermal

Relating to the skin.

Embroyotoxic

Causing toxic effects to the embryo during early pregnancy.

Entity

A single chemical.

Evaporation

The change of a substance from a liquid into the gaseous phase.

Exposure Standard

A national standard (Permissible Exposure Limit) which refers to airborne concentration of a chemical at which the risk to worker health based on an assessment of current technical data,

and evidence of know adverse effects, has been considered by the tripartite (government-employer-worker) consultative process to be acceptable.

Foetotoxic (foetotoxic)

Causing toxic effects to the foetus during pregnancy.

Flammability Limits

The range of concentrations of a flammable vapour in air at which a flame can be propagated or an explosion will occur, if a source of ignition is present. Normally expressed as upper and lower limits of this range (as percentages in air).

Flammable

Capable of being ignited and burning in air.

Flash Point

Flash point, in relation to extremely flammable, highly flammable and flammable chemicals, means the lowest temperature in ^{0}C at which a liquid will produce enough vapour to ignite.

Generic name

A name applied to a category or class of chemicals (e g. azo dyes, halogenated aromatic amines etc.)

Genotoxicity

The effect of causing damage to genetic material.

Heritable

Capable of being inherited.

Ingestion

Swallowing by the oral route

Inhalation

Breathing in.

Irritant

A chemical that will produce local irritation or inflammation on contact with tissue and membranes such as skin or eyes, or with nasal or lung tissue after inhalation.

LC_{L0}

The lowest concentration of a chemical (usually in air) that is reported to have caused death in humans or animals.

LC_{50}

A concentration of a chemical (usually in air) that is estimated to produce death in 50% of an experimental animal population on inhalation for a short period of time.

LD_{L0}

The lowest dose of a chemical that is reported to have caused death in humans or animals.

LD_{50}

A dose of a chemical applied either through ingestion, injection or application to the skin which produces death in 50% of a population of experimental animals. It is usually expressed as mg per kg of body weight.

Local effects

Harmful effects of a chemical at the point of contact or entry to the body.

Melting point

A temperature in ^{0}C at which a substance can exist in solid and liquid form. Normally measured at 760 mm Hg.

Metabolite

A substance produced by the action of the body on an absorbed chemical.

mm Hg

Millimetres of mercury (Hg). A unit pressure.

Mucous membrane

A membrane lining body cavities connected to the outside. From occupational health aspects the most important mucous membranes are the nose and throat linings.

Mutagenic

Means substances or preparation which if inhaled or ingested or penetrated into the skin, may induce genetic changes in spermatozoa or ovums cells or increase its incidence.

Oncogenic

Capable of producing tumours.

Oral

By mouth.

Percentage volatiles

Percentage of a chemical substance or substances that can be lost by evaporation.

Periodic Table

An arrangements of elements in order of increasing atomic number. Elements with the same number of outer electrons are arranged in vertical column.

Percutaneous

Through or across the skin. Usually refers to absorption of a chemical.

pH

A value representing how acid or alkaline a solution is. Water is natural at pH 7. Acids have a pH of less than 7. The lower the number, the stronger the acid (minimum 0). Alkalis have a pH greater than 7. The higher number, the stronger the alkali (maximum 14).

1	2	3	4	5	6	7							14
strong acids							neutral					strong alkalis	

Sensitisation

To become sensitive/allergic to the effected of a chemical.

Sensitiser

A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

Shock sensitivity

Tendency of a substance to explode if dropped or roughly handled.

Specific gravity

A measure at the destiny of a liquid compared with water.

STP, standard temperature and pressure

A convenient reference condition for gases. Consists of a temperature of $0^{o}C$ and a pressure of one atmosphere (760 mm Hg).

Substance

For the purposes of the CSDS, a substance for use at work is defined as any natural or artificial substance other than an article, whether in solid or liquid form or in the form of a gas or vapour which is intended for use in the workplace.

Systemic effects

Pertaining to the effects of a chemical on the organs and fluids of the body remote to the point of contact after absorption (as opposed to the local effects).

TC_{LO}

The lowest concentration of a chemical substance (usually in air) reported to produce any toxic effect in humans or animals.

TD_{LO}

The lowest dose of a chemical substance reported to produce any toxic effect in humans or animals.

Teratogenic

Means substance or preparation which if inhaled or ingested or penetrated into the skin of a pregnant woman, may induce deformation in the foetus or increase its incidence.

Teratogen

An agent capable of causing teratogenesis.

Toxic effect

The ability of an agent to produce damage to an organism. Usually refers to functional (systemic) damage but may be developmental in respect of tissue and skeleton in the case of the embryo. The damage may be permanent or transient.

Vapour pressure

The pressure characteristic at any given temperature in ^{o}C of a vapour in equilibrium with its liquid or solid form.

Volatility

The tendency of a solid or liquid material to pass into the vapour state at a given temperature in ^{o}C. Specifically, the vapour pressure of a component divided by its mole fraction (gram molecular weight) in the liquid or solid.

W/V, weight per volume

A measure of content of a solid in a solution.

W/W, weight per weight

A measure of content of a solid in a solid.

1. General

1.1. For the purpose of these guidelines, Chemical Safety Data Sheet (CSDS) means an up-to-date hand-out or information sheet containing relevant information pertaining to the hazardous chemical or preparation which is vital for establishing arrangements in the safe use of the chemical or preparation at work.

1.2. The CSDS should be written in layman language and should aim at achieving the following objectives:

(a) to make users of hazardous chemicals understand safety recommendations and the rationale for these recommendations ;

(b) to create awareness among users of hazardous chemicals of the consequences of failure to comply with the recommendations;

(c) to ensure that users of hazardous chemicals recognise the symptoms of overexposure; and

(d) to encourage the users of hazardous chemicals to provide inputs in establishing strategies and recommendations for the safe use of the hazardous chemicals.

1.3. The information provided on the CSDS should be arranged in a format which is clear and concise and are generally acceptable to the users.

2. Duty to Provide CSDS

2.1. The duty to furnish an up-to-date CSDS for each hazardous chemical is on the supplier as stipulated under Regulation 9(1) of the Occupational Safety and Health (Classification, Packaging and Labelling of Hazardous Chemicals) Regulations 1997 [P.U. (A) 143], hereinafter referred to as the Regulations. A supplier is a person who supplies chemicals and includes a formulator, a manufacturer, an importer or a distributor.

2.2. The information which a supplier should provide on the CSDS are stipulated in the Regulation 9(2) of the Regulations and consist of the following:

(a) The chemical product itself including the trade or common name of the chemical and the company identification with details of the supplier ;

(b) The composition of the ingredients that clearly identifies the hazardous chemical for the purpose of conducting a hazard evaluation;

(c) Hazard identification;

(d) First-aid measures;

(e) Fire-fighting measures;

(f) Accidental release measures

(g) Handling and storage;

(h) Exposure controls and personal protection (including possible methods of monitoring workplace exposure);

(i) Physical and chemical properties;

(j) Stability and reactivity;

(k) Toxicological information (including the potential routes of entry into the body and the possibility of synergism with other chemicals or hazards encountered at work);

(l) Ecological information;

(m) Disposal information;

(n) Transport information; and

(o) Date of preparation of the Chemical Safety Data Sheet.

2.3. The regulations also require that the supplier reviews and revises the CSDS whenever there are new information on the particular hazardous chemical.

3. FORMAT OF CSDS

3.1. The information in paragraph 2.2 should be organized and presented in a format illustrated in Table 1 and Table 2, where the CSDS is divided into sixteen (16) sections. Appendices I to XVI inclusive, describe the relevant and additional information to be included on the CSDS and illustrate how the information are to be presented.

3.2. The regulations require that the information are written in the national language and English. The national language version of the CSDS is presented in Table 2. Both versions should be in a single document rather than in 2 separate documents.

Note : Translation of the CSDS need not to be done line-by-line. It could be done either:

a) section by section;
b) page by page; or

c) as a whole.

3.3 If translation from English to the national language is required in the preparation of the CSDS, then the translation should be done by a translator registered with the Malaysian Translators Association (Persatuan Penterjemah Malaysia) or the Malaysian National Institute of Translation (Institut Terjemahan Negara Malaysia Berhad).

Table I : Sample Format Of CSDS in English language version

CHEMICAL SAFETY DATA SHEET

Introductory Details

Page x of total y :
Date of preparation :

SECTION 1 : CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1. Product Details

Product Name :
Trade Name :
Chemical Name :
Chemical Formula :
Molar Mass :
Chemical Family :
Manufacturer's Code :
Use :

1.2. Company Identification

Manufacturer's Name :
Importer's / distributer's Name & Address :
Emergency Telephone Number :

1.3. Contact Point

Designation :
Tel. No. :

Note : The contact point given should direct a caller to someone who can clarify information or provide further information and/or a bibliography of the product . The titles of a position or section should be inserted.

SECTION 2 : COMPOSITION / INFORMATION ON INGREDIENT

Chemical Name	CAS No.	Proportion	Exposure Limit	Toxicity Data

SECTION 3.0 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:
Odour	:
Solubility	:
Boiling Point	:
Melting Point (^{0}C)	:
Vapour Pressure (mm of Hg at 25 ^{0}C)	:
Percentage Volatiles	:
Evaporation Rate	:
Vapour Density	:
Specific Gravity	:
Flash point	:
Autoignition temperature	:
Flammable limit (%) and	:
other properties if applicable.	:

SECTION 4 : HAZARD IDENTIFICATION

Most important hazards

SECTION 5 : FIRST AID MEASURES

Ingestion	:
Eye contact	:
Skin contact	:
Inhalation	:
Notes to physician	:

SECTION 6 : FIRE FIGHTING MEASURES

Extinguishing Media	:
Fire fighting instruction	:
Special hazards	:

(Eg. Explosion properties and explosion hazards in the presence of various chemicals)

SECTION 7 : ACCIDENTAL RELEASE MEASURE

Leak/Spill :

SECTION 8 : HANDLING AND STORAGE

Handling :

Storage :

SECTION 9 : EXPOSURE CONTROL AND PERSONAL PROTECTION

a. Exposure Limit :

b. Engineering measureas :

c.Personal protection :

SECTION 10 : STABILITY AND REACTIVITY

Conditions to avoid :
Incompatibles :
Decomposition Products :
Hazardous polymerization :

SECTION 11 : TOXICOLOGICAL INFORMATION

Toxicity Data :
Carcinogenicity :

Reproductive Effect :
Effects of overexposure :

Chronic effects :
Target organs :

Medical Conditions Generally Aggravated by exposure :

SECTION 12 : ECOLOGICAL INFORMATION

Mobility & :
Bioaccumulation :
Biodegradability :
Aquatic Toxicity :

SECTION 13 : DISPOSAL INFORMATION

Disposal method in accordance with all applicable national environment laws and regulations.

SECTION 14 : TRANSPORT INFORMATION

-Any international and national regulatory requirements
-Packaging information
-Any other special requirements

SECTION 15 : REGULATORY INFORMATION

This section should contain information on proposed classification, risk phrase and safety phrase.

SECTION 16 : OTHER INFORMATION

This category contains any information not specified in other sections which the manufacturer could provide.

Table 2 : Sampel format of CSDS in National Language Version

RISALAH DATA KESELAMATAN KIMIA

Maklumat Pengenalan

Muka surat x daripada y :
Tarikh penyediaan :

BAHAGIAN 1 : PENGENALPASTIAN PRODUK KIMIA DAN SYARIKAT

1.1. Maklumat Produk

Nama produk :
Nama dagangan :
Nama kimia :
Berat molekul :
Kumpulan bahan kimia :
Kod pengeluar :
Kegunaan :

1.2. Pengenalpastian Syarikat

Nama pengilang dari luar negara /atau tempatan :
Alamat pembekal selain daripada pengilang (tempatan) :
No. tel. kecemasan :

1.3. Titik Hubungan

Nama pemberi maklumat :
Gelaran jawatan :
No. tel. :

Nota : Titik hubungan yang diberikan hendaklah terus kepada seseorang yang boleh memperjelas maklumat lanjut dan /atau bibliografi mengenai sesuatu produk/bahan kimia.

BAHAGIAN 2 : KOMPOSISI / MAKLUMAT BAHAN

Nama kimia	No. CAS	Kadaran	Had Pendedahan	Data ketoksikan

BAHAGIAN 3 : SIFAT-SIFAT FIZIKAL DAN KIMIA

Rupa :
Bau :
Kebolehlarutan :
Takat didih :
Takat lebur :
Tekanan wap (mm Hg pada 25 ^{0} C) :
Kadar sejatan :
Peratusan bahan mudah meruap :
Kadar penyejatan :
Ketumpatan wap :
Graviti tentu :
Takat kilat :
Suhu pengautocucuhan :
Had kemudahbakaran :
Sifat-sifat lain jika berkenaan :

BAHAGIAN 4 : PENGENALPASTIAN BAHAYA

Bahaya-bahaya paling utama :

BAHAGIAN 5 : LANGKAH-LANGKAH PERTOLONGAN CEMAS

Sentuhan mata :
Sentuhan kulit :
Sedutan :

BAHAGIAN 6 : LANGKAH-LANGKAH PEMADAMAN KEBAKARAN

Media pemadaman :
Arahan pencegahan api :
Bahaya-bahaya utama (bahaya letupan dengan adanya bahan kimia pelbagai) :

BAHAGIAN 7 : LANGKAH-LANGKAH PENGAWALAN PELEPASAN TIDAK SENGAJA

Kebocoran/tumpahan :

BAHAGIAN 8 : PENGENDALIAN DAN PENYIMPANAN

Pengendalian :

Penyimpanan :

BAHAGIAN 9 : KAWALAN PENDEDAHAN DAN PERLINDUNGAN DIRI

a. Had pendedahan :
b. Perlindungan diri :

perlindungan ingesan :
perlindungan mata/kulit :
perlindungan pernafasan :

c. Pengalihudaraan :

BAHAGIAN 10 : KESTABILAN DAN KEREAKTIFAN

Keadaan yang perlu dielak :
Bahan tak serasi :
Produkpeng uraian :
Pempolimeran berbahaya :

BAHAGIAN 11 : MAKLUMAT TOKSIKOLOGI

Data ketoksikan :
Kekarsinogenikan :
Kesan pembiakan :
Kesan pendedahan berlebihan :
Kesan kronik :
Organ sasaran :
Keadaan perubatan yang secara umum menjadi bertambah buruk akibat pendedahan :

BAHAGIAN 12 : MAKLUMAT EKOLOGI

Kebolehgerakan :
Pembiotumpukan :
Kebolehbiorosotan :

Ketoksikan :

BAHAGIAN 13 : MAKLUMAT PEMBUANGAN

Kaedah buangan menurut undang-undang dan peraturan persekitaran kebangsaan yang boleh diguna.

BAHAGIAN 14 : MAKLUMAT PENGANGKUTAN

- Mana-mana kehendak peraturan antarabangsa dan kebangsaan.
- Maklumat pembungkusan
- Mana-mana kehendak khas lain

BAHAGIAN 15 : MAKLUMAT PENGAWALAN

Bahagian ini hendaklah mengandungi maklumat tentang penandaan bahaya, ungkapan risiko dan ungkapan keselamatan.

BAHAGIAN 16 : MAKLUMAT LAIN

Bahagian ini mengandungi sebarang maklumat yang tidak dinyatakan dalam bahagian lain yang boleh diberikan oleh pengilang.

References

1. Guidance Note For Completion of a Material Safety Data Sheet, National Occupational Health And Safety Commission., Worksafe Australia. First Edition 1986.

2. National Code of Practice For the Preparation of the Material Safety Data Sheet, National Occupational Health And Safety Commission. Worksafe Australia. 1994.

3. ILO Code of Practice, Safety in the use of Chemicals at Work, ILO, 1993.

4. National Code of Practice for the Preparation of the Material Safety Data Sheet, New Zealand.1991.

5. MSDS from various sources.

6. Malone, L. J. ; Basic Concepts of Chemistry , 3rd. Edition. John Wiley & Sons (1989).

APPENDIX I

a. Introductory Details

I.1. This section describes the information to be provided under regulation 9 (2)(o) of the Regulations (sub-paragraph (o) of paragraph 2.2)

i. *Page x of total y* : To allow easy identification of the individual pages of an CSDS. The pages must be clearly numbered. X represents the page number starting from 1. Y-represents the total number of pages in the CSDS.

ii. *Date of preparation* : Express date as day/month/year; write month in full.

(1) Chemical Product And Company Identification

I.1. This section describes the information to be provided under regulation 9 (2)(a) of the Regulations (sub-paragraph (a) of paragraph 2.2)

1.1 Product Details

i. *Product Name* : Name of product.

ii.	*Trade Name*	:	A registered trade name or mark.
iii.	*Chemical Name*	:	The name of the hazardous chemical according to internationally recognised nomenclature and other common synonym/acronym name should be stated here. For example, for toluene diisocyanate, write TDI also.
iv.	*Chemical Formula*	:	The symbols of the elements and the number of atoms of each element that make up a compound. For example, for hydrochloric acid , write HCL.
v.	*Molar mass*:		The mass in grammes of one mole of an element or compound .
vi.	*Chemical Family*		Grouping of elements or compounds showing a systematic, gradual progression in chemical properties and chemical reactivity.
vii.	*Manufacturer's Code*	:	Includes any internal identification codes for this product.
viii.	*Use*	:	This sub-section should state the common uses of the product and it should be given in descending order of importance. The method of application should also be included. For example : Use : 'A spray on paint stripper'

1.2 Company Identification

i. Supplier's Name :

This subsection should state

a) the names of overseas or local manufacturers and
b) the names of local supplier (formulator or importer or distributer).

ii. Supplier's Tel Number :

The supplier (local supplier) company's telephone number, including the area code, where advice on

the hazardous chemical can be obtained. If the company's telephone is not manned on a 24 hour basis, an emergency telephone number should be added including area code.

1.3 Contact Point

The information given should not be a general switchboard number, but should direct a caller to someone who can clarify information or provide further information and/or a bibliography.
The titles of a position or section should be inserted. This contact point refers to the local supplier company.

I.2 An illustration of how this section should be presented is shown below.

a. Introductory Details

Page x of total y : 1 of 6
Date of preparation : 5-July 1996

(1) Chemical Product And Company Identification

1.1. Product Details

Product Name	:	Sulphuric Acid
Trade Name	:	Hydrogen Sulfate
Chemical Name	:	Sulphuric Acid
Chemical Formula	:	H2SO4
Molar Mass	:	98.07
Chemical Family	:	Phenolic Resin
Manufacturer's Code		VW&R Code : L1403
Use	:	Batery acid, fertilizers, pickling agent, dehydrating agent, waste water treatment.

1.2 Company Identification

Manufacturer's Name	:	Chemical Inc.,
Manufacturer's Address	:	123 , Coronation Drive, West Hill Ontario, Canada MIE 4R6.
Importer's Name	:	ABC Industries Sdn. Bhd.,
Importer's Address	:	No. 100, Jalan Permata 2, Batu 3, 40000 Shah Alam
Tel. No	:	(03) 5578234

Emergency Tel. No : (03)-5573452

1.3 Contact Point

Name of informator : Mr. Zaharudin Zahid
Designation : Technical Manager / Technical Services Information Officer
Tel . No. : : (03)- 5573424

APPENDIX II

(2) Composition / Information On Ingredient

II.1. This section describes the information to be provided under Regulation 9 (2)(b) of the Regulation (sub-paragraph (b) of paragraph 2.2)

II.2. This section should describe the actual composition of the hazardous chemical. It should be completed both for pure entities and for mixtures. The information should allow users to identify clearly the risks associated with a particular chemical so that they may conduct a risk assessment. Ingredient details should be listed in a column format under 3 headings, i.e : chemical name, CAS number and proportion.

II.3. Any additional information can also be included in this section e.g. the exposure limi

Chemical Name	CAS no.	Proportion	Exposure Limit	Toxicity Data

II.4. The description of information required under this section should be as follows :-

i . *Chemical name* .: Each ingredient present in a mixture, including impurities, should be listed by its chemical name according to the IUPAC naming system.

ii. *CAS No.* : Each ingredient should be listed with its Chemical Abstract Service (CAS) Number.

iii. *Proportion* : Ingredients should be listed with the ingredient representing the highest proportion first and so on in descending order. Solvents (including water) should be listed last. It is not possible to set a lower limit of chemicals included in this list as an entity at 0.01 % may be more than 10 times more toxic than one at 0.1%.

(Please note that the regulation only requires the composition of the hazardous ingredient(s) , to be stated)

iv. *Exposure limit:* The data from section 9 of Appendix IX could also be included in this subsection in order to search information easily.

v . *Acute Toxicity Data* The data from Section 11 of Appendix XII could also be included in this subsection.

II.5. Where the name of the chemical constitute confidential information, the name of the chemical may be omitted from the CSDS but according to Regulation 10 of the Occupational Safety And Health (Classification, Packaging And Labelling) Regulation 1997, the actual chemical name must be disclosed on written request to an occupational health doctor or to any person who uses or handles the chemical provided that the information is to be used only for the protection of the safety and health of employees.

II.6 The name of the chemical may be omitted and replaced by its generic name if the chemical is

a. non-hazardous as determined using the Guidelines on the Classification of Hazardous Chemicals;
b. classified as harmful or irritant as specified in Guidelines on the Classification of Hazardous Chemicals;
c. below the lowest relevant concentration cut-off level as specified in the List of Hazardous Chemicals to the Guidelines on Classification of Hazardous Chemicals.

II.7 If the exact amount of ingredient in the formulation cannot be specified, then the proportion ranges of each ingredient contained in the product should be indicated so as to provide as much information as possible about the potential hazards of a formulation. The following proportion changes should be indicated as :

Very High > 60 %
High (30% -60%)
Medium (10 % - 30%)
Low < 10%

II.8. The following three examples below show how ingredients should be presented taking into consideration the concern on confidentiality of information.

Example 1: Full disclosure of ingredients and composition of mixture.

xylene	[1330-20-7]	67 %
trichloroethylene	[79-01-6]	23%
ethanol	[64-17-5]	8%
benzene	[71-43-2]	0.9 %
other impurities		

Example 2: If the exact composition of the mixture is commercially confidential.

xylene	[1330-20-7]	very high
trichloroethylene	[79-01-6]	medium
ethanol	[64-17-5]	low
benzene	[71-43-2]	low
other impurities		

Example 3 : If the identity of trichloroethylene is commercially confidential.

xylene	[1330-20-7]	67%
chlorinated alkyl hydrocarbon		23%
ethanol	[64-17-5]	8%
benzene	[71-43-2]	0.9%
other impurities		

II.7. An illustration of how this section should be presented is shown below .

(2) : Composition / Information On Ingredient

Chemical Name	CAS Number	TLV-ACGIH	Proportion
DichlorofLuoroethane	17177-00-6	N/E	96%
Stoddard solvent/Mineral spirits	8052-41-3	100 PPM	1.5 %
Triethylated Silica	68988-56-7	100 PPM	1.4%
Xylene	1330-20-7	100 PPM	0.5%
1,2,4- Trimethyl Benzene	95-63-6	25 PPM	0.05%

APPENDIX III

(3) Physical And Chemical Properties

III.1. This section describe the information to be provided under Regulation 9 (2) (i) of the Regulations(sub-paragraph (I) of paragraph 2.2).

III.2. The data included in this section should apply to the product. If the product is a mixture, the data should describe the mixture. The information is useful for:-

- estimating exposure potential;
- handling leaks and spills;
- designing ventilation system; and
- aiding in design, development and checking of safety controls and procedures.

III.3 The information needed in this section are as follows :

i. *Appearance* : should be described in terms of colour and form (e.g brown liquid, grey powder)

ii. *Odour* : should be mentioned whether the odour of the product is detectable or not

iii. *Solubility* : when describing solids or powders, solubility in water in grams per litre or parts per million parts of water may be included

iv. *Boiling point and/or melting point* : boiling point and/or melting point at 760 mm Hg should be indicated in ^{0}C

v. *Vapour Pressure* : vapour pressure should be expressed in mm Hg at 25 ^{0}C

vi. *Percentage Volatiles* : Percentage by weight or volume at 25 ^{0}C should be inserted.

vii. *Evaporation Rate* : should state the reference liquid the ratio refers to

viii. *Vapour Density* : the density of the vapour compared to the density of air

ix. *Specific Gravity* : the density of the product compared to water with density of water being equal to one g/cm^3

x *Flash Point* : flash point should be expressed in ^{0}C. It should indicate the method that the data is established, either by closed or open cup methods.

xi. *Autoignition Temperature* : the minimum temperature required to start or cause self sustained combustion in any substance.

xii. *Flammability Limits* : it should be expressed as upper and lower limits.

xiii. *Other Information* : other information such as as odour threshold, volatility, penetration, viscosity @ 40 ^{0}C should be inserted

III.5 An illustration of how this section should be presented is shown below.

(4) Physical And Chemical Properties

Appearance : solid (semi solid gel)
Odour : slight
Solubility : insoluble in cold water
Boiling Point : >260 ^{0}C (500^{0}F)
Melting Point (^{0}C) : not Applicable
Vapour Pressure (mm of Hg at 25 ^{0}C) : not available
Percent Volatiles : not applicable
Evaporation Rate : not applicable
Vapour Density : not available
Specific Gravity : 0.88 @ 15 ^{0}C (water = 1)
Other properties if applicable : not available.

APPENDIX IV

(4) Hazard Identification

IV.1. This section describes the information to be provided under Regulation 9 (c) of the Regulations(sub-paragraph (c) of paragraph 2.2).

IV.2. This section should state the most important hazards.of the product .

IV.3. The list of most important hazards should be based on the following classification criteria:

i. This subsection is important for emergency overview purpose.

ii. The most important hazards include the health, physical and environmental hazards.

iii. The most severe effects of the product should be stated first and, if the effect is due to one ingredient in a formulation, this should be clearly indicated.

IV.4 An illustration of how this section should be presented is shown below.

(4) Hazard Identification

Most important hazards

Causes burns
Harmful by inhalation
Harmful if swallowed
Contact with combustible material may cause fire

APPENDIX V

(5) First Aid Measures

V.1. This section describes the information to be provided under Regulation 9 (2) (d) of the Regulations (sub-paragraph (d) of paragraph 2.2)

V.2. This section should state the instructions and advice to a Doctor.

V.3. The instructions in this subsection should be addressed to exposed individuals, first aid personnel and ambulance personnel They should describe the initial care that can be given without the use of sophisticated equipment and without a wide selection of medication available. If medical attention is required the data should show this (including its urgency).

V.4. Examples of suitable instructions are (if appropriate for the chemical) :

- give water or milk to drink and induce vomiting;
- irrigate with very generous quantities of water for 15 minutes;
- urgently seek medical assistance;
- seek medical advice. show this CSDS to a medical practitioner; or
- transport to a hospital or medical centre.

V.5. Advice to Doctor : Specific antidotes should be indicated where they are available. Where no specific antidote is available, the doctor should be advised to contact a poison information centre. This should also, if possible, indicate whether delayed effects can be expected after exposure.

V.6. An illustration of how this section should be presented is shown below.

(5) First Aid Measures

Eye contact	Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Do not use an eye oitment. Seek medical attention.
Skin contact	Remove contaminated clothing.- launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Get medical attention if redness or irritation occurs. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform mouth to mouth resuscitation. Administer oxygen if available. Allow the victim to rest in a well ventilated area. Seek medical attention.

APPENDIX VI

(6) Fire Fighting Measures

VI.1 This section describes the information to be provided under Regulation 9 (2) (e) of the Regulations (sub-paragraph (e) of paragraph 2.2)

VI.2 This Section should state the following information :

- Flammability data
- Fire-fighting media
- Fire fighting instructions
- Special hazard :
  (Fire hazards in presence of various chemical,
  Explosion hazards in presence of various chemical &
  Any dangerous decomposition products)

VI.3 An illustration of how this section should be presented is shown below.

(6) Fire Fighting Measures

a) Flammability Data

The product is	combustible
flash point :	OPEN CUP : >263^{0}C (>505.4^{0}F) Cleveland.
autoignition temperature	: >315 ^{0}C (>599 ^{0}F)
flammable limit (%) :	not available

b) Fire-fighting Media : small fire : Use dry chemical, foam or CO_2
large fire : Use water spray, fog or foam. Water or foam may cause frothing.

c) fire fighting instruction : Cool containing vessels in water spray in order to prevent pressure build-up, autoignition or explosion. Shutt off fuel to fire if it is possible to do so without hazard. Avoid flushing spilled material into sewers , streams or other bodies of water. For small out door fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required . Respiratory and eye protection are required for fire fighting personnel.

d) Special hazard (explosion hazards in presence of various chemical.)
Do not cut, weld, heat or drill empty container.

APPENDIX VII

(7) Accidental Release Measures

VII.1. This section describes the information to be provided under Regulation 9 (2) (f) of the Regulations.

VII.2. Information should be provided on the actions to be taken in the event of an accidental release (including leaks and spills) of a chemical.

VII.3.This subsection should include :

- Steps to minimise a spill or leak;
- Health and safety precautions : remove sources of ignition, provide sufficient ventilation, provide suitable personal protective equipment;
- environmental precautions : i.e. keep away from drains, alert emergency services;
- method of cleaning up spills and leaks: use suitable absorbent materials,

avoid production of gases/fumes by water or other diluent, use suitable neutralising agents;

- warnings : advise against reasonably foreseeable hazardous actions

VII.4. An illustration of how this section should be presented is shown below.

(7) Accidental Release Measures	
Leak/Spill :	Combustile liquid. Ventilate. Eliminate all sources of ignition. Dike and contain spill with inert material (sand, earth, etc.) and transfer liquid and solid separately to containers for recovery or disposal. Report as per regulatory requirements.

APPENDIX VIII

(8) Handling And Storage

VIII.1. This section describes the information to be provided under Regulation 9 (2)(g) of the Regulations (sub-paragraph (g) of paragraph 2.2)

VIII.2. This subsection should include all data required for the safe handling and storage requirements of the chemical, including:

- location;
- fire separation distances;
- ventilation;
- temperature conditions;
- protection from weather, sun light, etc.;
- type of container;
- types of products near which the material should not be stored;
- type of flooring;
- bunding;
- security;

- emergency facilities, e.g. showers, eye washes; (include as appropriate).

VIII.3. The information should recommend the safety phrases to be used on the product label.

VIII.4. An illustration of how this section should be presented is shown below.

(8) : Handling And Storage

Handling :	Avoid smoking and use of open fire. Avoid inhalation of vapours and contact with skin and eyes. Observe good industrial practices.
Storage :	Store in tightly closed original container in well-ventilated place.

APPENDIX IX

(9) Exposure Control And Personal Protection

IX.1. This section describes the information to be provided under Regulation 9 (2) (h) of the Regulations (sub-paragraph (h) of paragraph 2.2)

IX.2. This section should focus on the exposure limit relevant to the product or any or all of its ingredients and the requirements for engineering measures and/or protective equipment

IX.3 Emphasis in the chemical safety data sheet should be on engineering methods of minimising and controlling exposure rather than on the need for protective equipment.

a. Exposure Limits

i. The exposure limit expresses the highest airborne concentration of a chemical to which nearly all adults can be exposed repeatedly without adverse effect. It represent a standard against which the measured time-weighted average concentration over an eight hour period may be compared case.

ii. The local Permissible Exposure Limit is to be used unless it is unavailable, in which another standard may be quoted.

iii. Any short-term or ceilling limits that the concentration should not be permitted to exceed and any maximum exposure periods should be added to the CSDS and indicated as such.

iv. If the listing of the EL includes the skin notation, then it should be included also in this section.

b. Engineering Measures

i. This subsection should recommend appropriate engineering measures and indicate whether special ventilation requirements are necessary and specify which type e.g. use in a well-ventilated area , ensure ventilation is adequate to maintain air concentrations below EL , local exhaust ventilation required etc.

c. Personal Protection

i. Information under this heading should be specific both about when protection is required and the type required. This information may not be relevant for emergency services. The specific types of respirators etc. should be defined e.g. ` approved face mask' will not be sufficient information whereas `approved half-face cartridge respirator suitable for organic vapours' could be sufficient.

ii. Special requirements may exist for gloves or other protective clothing to prevent skin exposure, so that specifics of material are needed; that is ` impervious gloves' is not sufficient whereas `PVC gloves' or `nitrile gloves' could be used.

iii. Similarly, eye protection if required should be described as "general use industrial safety glasses" or other specific requirements.

IX.4. An illustration of how this section should be presented is shown below.

(9) Exposure Control And Personal Protection

a. Exposure Limit

Chemical Name	CAS No.	Standard*	Reference
Lead oxide	1314-41-6	0.15 mg/m^3	DOSH, Malaysia

note* : 8 hr. .time weighted average exposure unless stated otherwise

b. Ventilation

Use general or local exhaust ventilation to meet exposure limit requirements.

c. Personal protection

Eye /Skin Protection : Safety glasses, uniform, apron, butyl rubber gloves are recommended.

Respiratory protection : None required where adequate ventilation conditions exist . If airborne concentration exceeds exposure level, a high efficiency particulate respirator is recommended . If concentration exceeds capacity of respirator, a self-contained breathing apparatus is advised.

APPENDIX X

(10) Stability And Reactivity

X.1. This section describes the information to be provided under Regulation 9 (2)(j) of the Regulations (sub-paragraph (j) of paragraph 2.2).

X.2. The possibility of hazardous reactions under certain conditions should be stated. That is such as :

i) Avoid physical conditions e.g. temperature, pressure, light, shock, contact with moisture or air;

ii) Avoid proximity to other chemicals e.g. acids, bases, oxidising agents or Any other specific substance that may cause a dangerous reaction.

X.3. Where hazardous decomposition products are given off, these should be specified along with the necessary precautions.

X.4. An illustration of how this section should be presented is shown below.

(10) Stability And Reactivity

conditions to avoid : heat, flame
incompatibles : strong oxidising agents, chlorine.
decomposition products : carbon monoxide, carbon dioxide.
hazardous polymerization : will not occur.

APPENDIX XI

(11) Toxicological Information

XI.1. This section describes the information to be provided under Regulation 9 (2)(k) of the Regulations (sub-paragraph (k) of paragraph 2.2.)

XI.2. This section should give information on the effects of the chemical on the body by its potential routes of entry into the body and the toxicity data. Reference should be made for overexposure effects both acute and chronic . Reference should also be made to health hazards as a result of possible reaction with other chemicals including any known interactions , for example, resulting from the use of medication , tobacco and alcohol.

XI.3. An illustration of how this section should be presented is shown below.

(11) Toxicological Information

Toxicity Data

intraperitoneal mouse LD_{50} for methylene chloride	437 mg/kg
subcutaneous mouse LD_{50} for methylene chlorode	6460 mg/kg
inhalation - 30 min rat LC_{50} for methylene chloride	88 g/m^3

Carcinogenicity

This substance is IARC- listed as a probable human carcinogen (Group 2A and 2B)

Reproductive Effect

Tests on laboratory animals indicate material may be mutagenic.

Effects of overexposure

Route of Entry	Effects
inhalation	headache, nausea, vomiting, dizziness, narcosis, weakness, fatigue, irritation of upper respiratory tract, central nervous system depression, causes methemoglobulin in the blood, pulmonary edema, unconsciousness and may be fatal.
skin contact	irritation, may be harmful, prolonged contact may cause dermatitis.
eye contact	Irritation, may cause temporary corneal damage
skin absorption	none identified
ingestion	headache, nausea, vomiting, dizziness, narcosis weakness, fatigue, irritation of upper respiratory tract, central nervous system depression, causes methemoglobulin in the blood, unconsciousness and may be fatal.

Chronic Effects

Damage to liver, kidneys, lungs , blood, central nervous system.

Target Organs

Respiratory system, lungs, cardiovascular system, central nervous system, liver, kidneys, eyes and skin.

Medical Conditions Generally Aggravated by exposure

Cardiovascular disorders, heart disorders, liver or kidney disorders, central nervous system disorders,heavy drinking, heavy smoking.

APPENDIX XII

(12) Ecological Information

XII.1 This section describes the information to be provided under regulation 9 (2)(l) of the regulations (sub-paragraph (l) of paragraph 2.2.)

XII.2 The most important characteristics likely to have an effect on the environment should be described.

XII.3 Typical information that should be given, where appropriate, includes the potential routes for release of the chemical and its persistence and biodegradability, bioaccumulative potential and aquatic toxicity, and other data relating to ecotoxicity, e.g. effects on water treatment works.

XII.4 An illustration of how this section should be presented is shown below.

(12) Ecological Information

Mobility & Bioaccumulation	:	Miscible in water Low bioconcentration factor (BCF)
Biodegradability	:	Not biodegradable. Long term adverse effects in the equatic environment is expected.
Toxicity	:	Harmful to aquatic organisms.

APPENDIX XIII

(13) Disposal Information

XIII.1. This section describes the information to be provided under Regulation 9 (2)(m) of the Regulations (sub-paragraph (m) of paragraph 2.2.).

XIII.2. This section should contain specific recommendation on :

- disposal containers;
- disposal Method;
- the need to check local statutory requirements;
- special precautions for incineration or landfill.

XIII.3. In this section, recommendations on disposal methods is considered essential. Disposal into sewerage systems should be discouraged.

XIII.4. Recommendation for small- and large- scale disposals should be distinguished

from each other.

XIII.5 An illustration of how this section should be presented is shown below.

(13) : Disposal Information

Disposal of waste to be in accordance with the Environmental Quality (Scheduled Wastes) Regulation 1989 and other guidelines issuance by DOE and/or local authorities.

APPENDIX XIV

(14) Transport Information

XIV.1. This section describes the information to be provided under Regulation 9 (2)(n) of the Regulations (sub-paragraph (n) of paragraph 2.2.)

XIV.2. This subsection should list :

- Any international and national regulatory requirements;
- Packaging information ; and
- Any other special requirements (hazard such as shock sensitivity should be restated here, if necessary) relevant to transport.

XIV.3. An illustration of how this section should be presented is shown below.

(14) Transport Information

UN Number: 1866
T.D.G Classification : 3
packing group : II
special shipping instructions : not applicable

APPENDIX XV

(15) Regulatory Information

XV.1 This section should contain information on proposed classification, risk phrase and safety phrase.

XV.2 The proposed classification should be based on the following classification criteria.

i. The purpose of stating the proposed classification of the product is to give the danger identification that must be shown on label.

ii. The proposed classification should show the greatest degree of hazard. The product is classified according to its physico-chemical properties and health effects. When the

product exhibits more than one category of hazard in each type, it should be classified under the category which poses the greatest degree of hazard.

XV.3 An illustration of how this section should be presented is shown below .

(15) Regulatory Information

a. Proposed classification : **Toxic**

b. ***R Phrase*** **:**

R20/R21/22	Harmful by inhalation, in contact with skin and if swallowed
R43	May cause sensitization by skin contact
R48	danger of serius damage to health by prolonged
R23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
R45	May cause cancer
R46	May cause heritable genetic damage.

c. Safety phrases

S53	Avoid exposure-obtain special instructions before use.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S36	wear suitable protective clothing
S7	keep container tightly closed

APPENDIX XVI

(16) Other Information

XVI.1. This section contains any information not specified in other sections which the manufacturer could provide.