

ICS 13.300
A80

GB

National Standard of the People's Republic of China

GB 13690 – 2009
Replaces GB 13690 – 1992

General Rule for Classification and Hazard Communication of Chemicals

Issued Date: June 21 2009

Implementation Date: May 1 2010

Issued by

General Administration of Quality Supervision, Inspection and Quarantine of the
People's Republic of China

and

Standardization Administration of the People's Republic of China

Foreword

Chapters VI and V in the Standard are mandatory, whilst the rest are recommended.

The conformity degree between this Standard and its corresponding regulation, the second revised edition of “*Globally Harmonized System of Classification and Labeling of Chemicals*” (GHS) ((ST/SG/AC.10/30/), is non-equivalent. This Standard’s technical contents are in conformity with those of the GHS. In accordance with GB/T1.1 – 2000, some editorial changes have been made to the Standard’s format.

The main differences between this Standard when compared to GB 13690 – 1992 *Classification and Labels of Dangerous Chemical Substances Commonly Used* are:

- The Standard’s title is changed into “*General Rule for Classification and Hazard Communication of Chemicals*”;
- In accordance with the requirements set forth in the GHS, the Standard sets up hazard classification of chemicals; and
- In accordance with the requirements set forth in the GHS, hazard communication of chemicals is stipulated in the Standard.

Annexes A, B, C and D to the Standard are informative appendices.

This Standard is proposed by and is under the jurisdiction of the Dangerous Chemicals Management of Standardization Administration of China (SAC/TC251).

The organizations that participated in the drafting of this Standard:
Chemical Engineering Standardization Research Institute of China;
Shandong Entry-Exit Inspection & Quarantine Bureau;
Shanghai Chemical Research Institute;
Jiangsu Entry-Exit Inspection & Quarantine Bureau; and
Hubei Entry-Exit Inspection & Quarantine Bureau

The main drafters of this Standard:
ZHANG Shao-Yan, CUI Hai-Rong, YANG Yi, WANG Xiao-Bing, MEI Jian, TANG Li-Jun, CHE Li-Dong, CHEN Hui-Ming and ZHOU Wei.

This Standard replaces the previously issued Standard:
- GB 13690 – 1992.

General Rule for Classification and Hazard Communication of Chemicals

1. Scope

The Standard specifies the classification and hazard communication of chemicals in consistence with the GHS.

The Standard applies to the classification and hazard communication of chemicals. Besides, the Standard governs the labels of chemical workplaces and of chemical consumer goods.

2. Normative References

The provisions of the following documents become provisions of this Standard after being referenced. For dated reference documents, all later amendments (excluding corrigenda) and versions do not apply to this Standard; however, the parties to the agreement are encouraged to study whether the latest versions of these documents are applicable. For undated reference documents, the latest versions apply to this Standard.

GB/T 16483 Material Safety Data Sheet the Order of Contents and Subtitles

GB 20576 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Explosives

GB 20577 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Flammable gases

GB 20578 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Flammable aerosols

GB 20579 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Oxidizing gases

GB20580 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Gases under pressure

GB 20581 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Flammable liquids

GB 20582 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Flammable solids

GB 20583 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Self-reactive substances

GB 20584 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Self-heating substances

GB20585 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Pyrophoric liquids

GB20586 Safety rules for classification, precautionary labeling and precautionary statements of chemicals - Pyrophoric solids

GB20587 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Substances which, in contact with water, emit flammable gases

GB20588 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Corrosive to metals

GB20589 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Oxidizing liquids

GB20590 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Oxidizing solids

GB20591 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Organic peroxides

GB20592 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Acute toxicity

GB20593 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Skin corrosion/ irritation

GB20594 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Serious eye damage/ eye irritation

GB20595 Safety rules for classification, precautionary labeling and precautionary statements of chemicals - Respiratory or skin sensitization

GB20596 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Germ cell mutagenicity

GB20597 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Carcinogenicity

GB20598 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Reproductive toxicity

GB20599 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Specific target organ systemic toxicity – Single exposure

GB20601 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Specific target organ systemic toxicity – Repeated exposure

GB20602 Safety rules for classification, precautionary labeling and precautionary statements of chemicals – Hazardous to the aquatic environment

GB/T 22272 – GB/T 22278 Serial Standards over Good Laboratory Practice (GLP)
ISO 11683:1997 Package Exposure Hazards Warning Requirements

International Program on Chemical Safety/Environmental Health Criteria - No. 225
Document “Principles for Evaluating Health Risks to Reproduction Associated With
Exposure to Chemicals”

3. Terms & Definitions

A series of the National Standards (GB 20576 – GB 20599, GB 20691 & GB 20602) converted from the GHS as well as the following terms and definitions shall apply to this Standard.

3.1

Chemical identity

It refers to a name to solely identify a chemical product. The name can either meet the IUPAC chemical nomenclature/CAS chemical nomenclature or can be a technical name.

3.2

Compressed gas

It refers to a kind of gas which is completely at the gaseous stage at the temperature of -50°C ; moreover, it includes all the gases whose critical temperatures are higher than -50°C .

3.3

Flash point

Flash point of a volatile liquid is the lowest temperature (as adjusted to the standard air pressure of 101.3 kPa) at which it can vaporize to form an ignitable mixture in air where an ignition source shall be used under proper experimental conditions.

3.4

Hazard category

It refers to the classification for each hazard class. For instance, acute oral toxicity comprises five hazard categories whereas inflammable liquid comprises four hazard categories. The categories with serious hazards cannot be compared to those with general hazards within the same hazard class.

3.5

Hazard class

It refers to the property of physical hazards, health hazards and environmental hazards, such as inflammable solid, carcinogen, acute oral toxicity and etc.

3.6

Hazard statement

Hazard statements are standardized and assigned phrases that describe the hazard(s) as determined by hazard classification. The degree of the hazard is also included in hazard statements when appropriate.

3.7

Initial boiling point

It refers to the recorded temperature at which the first drop of distilled vapor is liquefied and falls from the end of the condenser when vapor pressure of the liquid is equal to the standard pressure (101.3 kPa).

3.8

Label

It refers to a combination of words, printings or pictograms descriptive of a hazardous product. A label is selected due to its relevance with target sectors. The label is attached to or inscribed to the container or outer packing for the product.

3.9

Label element

Label elements refer to the information on a label, such as pictograms and signal words

3.10

Recommendations on the Transport of Dangerous Goods, Model Regulations

A formal publication entitled “*Model Regulations on the Transport of Dangerous Goods*” as an appendix to *the UN Recommendations on the Transport of Dangerous Goods* approved by the United Nations Trade and Development Board.

3.11

Pictogram

It refers to a picture comprising a hieroglyphic symbol and other pictographs, such as label border, background pattern or color, to convey a specific message.

3.12

Precautionary statement

A precautionary statement is a phrase (and/or pictogram) that describes the recommended measures that should be taken to prevent/minimize adverse effects from exposure to a hazardous product or improper storage or handling of the product.

3.13

Product identifier

A product identifier means the name or number used on a GHS label for a hazardous product and it should match the product identifier used on the SDS. It provides users with the sole means to identify a substance or mixture in a specific context, such as in transporting, consuming the product or handling it at workplace.

3.14

Signal word

A signal word indicates the relative degree of severity a hazard on the label and

reminds the readers about potential danger. The signal words used in the GHS are "**Danger**" and "**Warning**".

3.15

Symbol

It aims to briefly and concisely convey the message contained in pictograms.

4. Classification

4.1 Physical & Chemical Hazards

4.1.1 Explosives

Please refer to GB 20576 for the classification, warning labels and warning statements for explosives.

4.1.1.1 An explosive substance (or mixture) is a solid or liquid which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.

A pyrotechnic substance (or mixture) is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative, self-sustaining, exothermic chemical reactions.

An explosive article is a material that contains one kind or several kinds of explosive substances or mixtures.

A pyrotechnic article is a material that contains one kind or several kinds of pyrotechnic substances or mixtures.

4.1.1.2 Classification of explosives comprises:

- a) Explosive substances and mixtures;
- b) Explosive articles; however, the following devices are excluded: the explosive substances or mixtures contained in the devices, due to the quantity or property of the substances or mixtures, are unable to produce any effect outside the devices upon accidental or occasional ignition after emission, fire, smoke, heat or a loud booming sound occurs; and
- c) Substances, mixtures and articles, not mentioned in a) and b), that are designed to produce actual explosion or firework effect.

4.1.2 Flammable Gases

Please refer to GB 20577 for the classification, warning labels and warning statements for flammable gases.

Flammable gas means a gas having a flammable range in air at 20°C and a standard pressure of 101.3 kPa.

4.1.3 Flammable Aerosols

Please refer to GB 20578 for the classification, warning labels and warning statements for flammable aerosols.

Aerosols are any gas compressed, liquefied or dissolved under pressure within a non-refillable container made of metal, glass or plastic, with or without a liquid, paste or powder. The container is fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid or gaseous state.

4.1.4 Oxidizing Gases

Please refer to GB 20579 for the classification, warning labels and warning statements for oxidizing gases.

Oxidizing gas means any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

4.1.5 Gases under Pressure

Please refer to GB 20580 for the classification, warning labels and warning statements for gases under pressure.

Gases under pressure are gases that are contained in a receptacle at a pressure not less than 200 Pa or as a liquefied gas or as a refrigerated liquefied gas.

Gases under pressure comprise compressed gas, liquefied gas, dissolved gas and refrigerated liquefied gas.

4.1.6 Flammable Liquids

Please refer to GB 20581 for the classification, warning labels and warning statements for flammable liquids.

Flammable liquid means a liquid having a flash point of not more than 93°C.

4.1.7 Flammable Solids

Please refer to GB 20582 for the classification, warning labels and warning statements for flammable solids.

Flammable solids are solids that are readily combustible, or may cause or contribute to fire through friction.

Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.

4.1.8 Self-Reactive Substances or Mixtures

Please refer to GB 20583 for the classification, warning labels and warning statements for **self-reactive substances**.

4.1.8.1 Self-reactive substances are thermally unstable liquids or solids liable to undergo a strongly exothermic thermal decomposition even without participation of oxygen (air). This definition excludes materials classified under the GHS as explosive, organic peroxides or as oxidizing substances or mixtures.

4.1.8.2 Self-reactive substances or mixtures possess explosive properties if their components are liable to detonate or deflagrate rapidly or show vigorous effect when they are being heated in a sealed environment in a laboratory experiment.

4.1.9 Pyrophoric Liquids

Please refer to GB 20585 for the classification, warning labels and warning statements for pyrophoric liquids.

A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

4.1.10 Pyrophoric Solids

Please refer to GB 20586 for the classification, warning labels and warning statements for pyrophoric solids.

A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.

4.1.11 Self-Heating Substances or Mixtures

Please refer to GB 20584 for the classification, warning labels and warning statements for **self-heating substances**.

A self-heating substance or mixture is a solid or liquid, other than a pyrophoric substance, which, by reaction with air and without energy supply, is liable to self-heat. This endpoint differs from a pyrophoric substance in that it will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).

Note: The self-heating of such substances or mixtures may result in spontaneous combustion, because that the substances or mixtures react with oxygen (oxygen in the air) and the heat from the reaction is unable to escape quickly enough. When heat generation over-speeds heat consumption to the extent that the temperature of the substance rises to its spontaneous ignition point, spontaneous combustion begins.

4.1.12 Substances or Mixtures which on Contact with Water Emit Flammable Gases

Please refer to GB 20587 for the classification, warning labels and warning statements for substances which on contact with water emit flammable gases.

Substances or mixtures that, in contact with water, emit flammable gases are solids or liquids which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

4.1.13 Oxidizing Liquids

Please refer to GB 20589 for the classification, warning labels and warning statements for oxidizing liquids.

An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material.

4.1.14 Oxidizing Solids

Please refer to GB 20590 for the classification, warning labels and warning statements for oxidizing solids.

An oxidizing solid is a solid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material.

4.1.15 Organic Peroxides

Please refer to GB 20591 for the classification, warning labels and warning statements for organic peroxides.

4.1.15.1 An organic peroxide is an organic liquid or solid which contains the bivalent -O-O- structure and may be considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Such substances and mixtures may:

- a). be liable to explosive decomposition;
- b). burn rapidly;
- c). be sensitive to impact or friction; and
- d). react dangerously with other substances.

4.1.15.2 An organic peroxide possesses explosive properties when the components of the substance or mixture are liable to detonate or deflagrate rapidly or show vigorous effect when it is being heated in a sealed environment in a laboratory experiment.

4.1.16 Substances Corrosive to Metal

Please refer to GB 20588 for the classification, warning labels and warning statements for substances corrosive to metal.

A substance or a mixture that by chemical action will materially damage, or even destroy, metals is termed 'corrosive to metal'.

4.2 Health Hazards

4.2.1 Acute Toxicity

Please refer to GB 20592 for the classification, warning labels and warning statements for acute toxicity.

Acute toxicity describes the adverse effects resulting from a single oral or skin exposure to a substance or repeated oral or skin exposures to the substance within 24 hours, or the adverse effects resulting from 4-hour inhalation.

4.2.2 Skin Corrosion/Irritation

Please refer to GB 20593 for the classification, warning labels and warning statements for skin corrosion/irritation.

The symptoms of skin corrosion comprise ulcers, bleeding and bleeding scars; moreover, the skin, balding area and scars fade due to blanching when a 14-day observation comes to an end. It should be considered to assess whether some suspicious pathological changes begin.

Skin corrosion means the production of irreversible damage to the skin following the application of a test substance for up to 4 hours when the destruction of epidermal and dermal tissues can be observed.

Skin irritation means the production of reversible damage to the skin following the application of a test substance for up to 4 hours.

4.2.3 Serious Eye Damage/Eye Irritation

Please refer to GB 20594 for the classification, warning labels and warning statements for **serious eye damage/eye irritation**.

Serious eye damage means the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the front surface of the eye, which is not fully reversible within 21 days of application.

Eye irritation means changes in the eye following the application of a test substance to the front surface of the eye, which are fully reversible within 21 days of application.

4.2.4 Respiratory sensitization/Skin sensitization

Please refer to GB 20595 for the classification, warning labels and warning statements for **respiratory sensitization/skin sensitization**.

- 4.2.4.1 Respiratory sensitizer means a substance that induces hypersensitivity of the airways following inhalation of the substance. Skin sensitizer means a substance that will induce an allergic response following skin contact.
- 4.2.4.2 There are two phases for sensitization: Phase I concerns with that someone's certain immunological memory is induced due to his/her exposure to an allergen; Phase II mainly concerns with the development, i.e. an sensitized individual has developed a cell-mediated or antibody-mediated sensitization resulting from his/her exposure to an allergen.
- 4.2.4.3 In the case of respiratory sensitization, the phase for development is subsequently induced as same as in the case of skin sensitization. In the case of skin sensitization, there should be an inducement phase where immune system can learn to respond to an allergen; thereafter, some clinical symptoms may appear, and one's exposure at that phase (development phase) will fully induce visible skin response. Therefore, predictive tests are usually done in such a form. Among them, there is an inducement phase, and the response to the phase can be measured through a standard development phase. A spot test is a typical practice, whereas a local lymph node assay for direct measurement of inducement on response is deemed as an exceptional practice. Usually, the evidence for human skin sensitization is assessed through a diagnostic spot test.
- 4.2.4.4 As for skin sensitization and respiratory sensitization, numerical values required for inducement is generally lower than those required for development.

4.2.5 Germ Cell Mutagenicity

- 4.2.5.1 Please refer to GB 20596 for the classification, warning labels and warning statements for germ cell mutagenicity.
- 4.2.5.2 The hazard class mainly concerns with chemicals that may give rise to an occurrence of mutations in populations of heritable cells and/or organisms. However, when substances and mixtures in this hazard class are assigned to hazard categories, *in vitro* mutagenicity tests, reproductive toxicity testing and *in vivo* somatic cell mutagenicity tests in mammals, as well as reproductive toxicity tests should also be taken into consideration.
- 4.2.5.3 The definitions for the terms such as "giving rise to an occurrence of mutations", "mutagen", "mutation" and "reproductive toxicity" used in this Standard are common definitions and terms. Mutation means a permanent alteration to the quantity or the physical composition of a DNA gene such that the genetic message is changed.
- 4.2.5.4 "Mutation" is used in the context when a DNA gene is damaged or changed in such a way as to alter the genetic message carried by that gene (for example, including chromosome alterations and translocation caused by some certain base). The two terms of "giving rise to an occurrence of mutations" and "mutagen" are used in describing an agent giving rise to an increased

occurrence of mutations in populations of cells and/or organisms.

4.2.5.5 The two general terms of “reproductive toxic” and “reproductive toxicity” are used in the alteration to DNA structure, information content, separating reagents and separating process, including the reagents or processes that damage DNA genes through intervening the normal DNA replication process or alter DNA replication in a non-physiological way (temporarily). Usually, the results of reproductive toxicity tests are used as an indicator for mutagenicity.

4.2.6 Carcinogenicity

4.2.6.1 Please refer to GB 20597 for the classification, warning labels and warning statements for carcinogenicity.

4.2.6.2 The term “Carcinogen” means a chemical substance or a mixture of chemical substances which induce cancer or increase its incidence. In carrying out the good testing and research practice on animals, the substances which induce benign and malignant tumors are also deemed to be presumed or suspected human carcinogen unless verified evidence shows that the mechanism of tumor formation has nothing to do with human.

4.2.6.3 Chemicals in this hazard class are assigned to one of two hazard categories based on their intrinsic property. The information in respect to the levels of human carcinogenicity risks resulting from the use of such a chemical is not provided.

4.2.7 Reproductive Toxicity

Please refer to GB 20598 for the classification, warning labels and warning statements for **reproductive toxicity**.

4.2.7.1 Reproductive toxicity

Reproductive toxicity includes adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in offspring. The definition below was given in International Program on Chemical Safety/Environmental Health Criteria - No. 225 Document.

In this Standard, reproductive toxicity is subdivided into two major subtitles:

- a) Adverse effects on sexual function and fertility; and
- b) Adverse effects on the development of offspring.

Some reproductive toxic effects cannot be specifically attributed to damages to sexual function and fertility or developmental toxicity in offspring. In despite of it, chemicals with such effects should be assigned to the hazard class of reproductive toxicity and general hazard statements should be attached to them.

4.2.7.2 Adverse Effects on Sexual Function and Fertility

Chemicals' any effect to intervene with fertility. It may include (but not limited to) the

alteration to female and male reproductive systems, adverse effects on the onset of puberty, gamete production and transport, normal reproductive cycle, sexual behavior, fertility as well as labor and pregnancy results, early reproductive ageing, or the alteration to other functions dependent on the completeness of reproductive system.

Besides, adverse effects on lactation or adverse effects resulting from lactation are assigned to the hazard class of reproductive toxicity. However, these effects are assigned to a separate category for the purpose of classification. It would be better to properly assign chemicals' adverse effects on lactation to a special category; hence, specific hazards warnings in respect to such effects can be provided to mothers during lactation.

4.2.7.3 Adverse Effects on the Development of Offspring

In the broadest sense, developmental toxicity comprises any effect intervening normal development of pre-born and post-born children. Such effects were resulted from a parent's exposure(s) to hazards before conception, or resulted from the developing offspring's exposure(s) to hazards before birth or from birth to sex maturation. However, the sub-classifications under the subtitle of developmental toxicity are mainly to provide hazard warnings to pregnant women as well as fertile men and women. Hence, to attain a pragmatic goal on classifications, developmental toxicity essentially means adverse effects arising from pregnancy or resulting from parents' exposures to hazards. These effects may come out anytime during the life cycle of a fetus.

The symptoms of development toxicity mainly comprise:

- a) The death of a developing fetus;
- b) An abnormal structure;
- c) Growth changes; and
- d) Functional deficiency.

4.2.8 Target Organ Systemic Toxicity (TOST): Single Exposure

Please refer to GB 20599 for the classification, warning labels and warning statements for Target Organ Systemic Toxicity (TOST): Single Exposure.

4.2.8.1 The objective of the sub-clause is to provide a method to classify substances bringing about non-lethal target organ/systemic toxicity after a single exposure.

All significant health effects, not otherwise specifically included in Sub-clauses 4.2.1 – 4.2.7 of the Standard, that can impair function, both reversible and irreversible, immediate and/or delayed are included in the non-lethal target organ/systemic toxicity class (TOST).

4.2.8.2 Chemicals classified into the group are known as the substances which can cause specific target organ toxicity. These chemical substances may cause potential health hazards to those who have exposures to them.

4.2.8.3 In order to help reach a decision about whether a substance should be classified or not, there should be some reliable evidences showing identically identifiable toxicity in humans and tested animals after a single exposure to

the substances, significant toxicity changes affecting tissues/organs' functions or shapes, or severe biological or hematological changes to organisms, which are in relation to human health. The data of humans are the major source of evidence for the hazard classification.

4.2.8.4 The evaluation shall not only cover significant changes in a single organ or biological system but also cover generalized changes of a less severe nature involving several organs.

4.2.8.5 Target organ/systemic toxicity class (TOST) may be caused in any way in relation to humans, such as oral intake, skin exposure or inhalation.

4.2.9 Target Organ Systemic Toxicity (TOST): Repeated Exposure

Please refer to GB 20601 for the classification, warning labels and warning statements for Target Organ Systemic Toxicity (TOST): Repeated Exposure.

4.2.9.1 The objective of the sub-clause is to provide a method to classify substances bringing about non-lethal target organ/systemic toxicity after repeated exposure. All significant health effects that can impair function, both reversible and irreversible, immediate and/or delayed are included in the non-lethal target organ/systemic toxicity class (TOST).

4.2.9.2 Chemicals classified into the group are known as the substances which can cause specific target organ toxicity. These chemical substances may cause potential health hazards to those who have exposures to them.

4.2.9.3 In order to help reach a decision about whether a substance should be classified or not, there should be some reliable evidences showing identically identifiable toxicity in humans and tested animals after repeated exposure to the substances, significant toxicity changes affecting tissues/organs' functions or shapes, or severe biological or hematological changes to organisms, which are in relation to human health. The data of humans are the major source of evidence for the hazard classification.

4.2.9.4 The evaluation shall not only cover significant changes in a single organ or biological system but also cover generalized changes of a less severe nature involving several organs.

4.2.9.5 Target organ/systemic toxicity class (TOST) may be caused in any way in relation to humans, such as oral intake, skin exposure or inhalation.

4.2.10 Aspiration Hazard

Note: this hazard is not converted into the National Standard of China.

4.2.10.1 The objective of the sub-clause is to classify the substances or mixtures which may bring about aspiration hazard to humans.

4.2.10.2 The term "aspiration" means the entry of a liquid or solid directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system.

4.2.10.3 Aspiration toxicity includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration.

4.2.10.4 Aspiration starts at the moment of an inhale when the substance causing

effects stops at the interface between the upper respiratory tract and the upper gastrointestinal tract.

4.2.10.5 The aspiration of the substance or mixture may occur when it is vomited after digestion. It may be an impact upon the label, especially when the advice on giving rise to vomiting after digestion needs to be considered due to acute toxicity. However, if the substance or mixture takes on the hazard of aspiration toxicity, then the advice on giving rise to vomiting may need to be revised.

4.2.10.6 Special Considerations

- a) According to a review of some medical literatures regarding chemical aspiration, some hydrocarbons (petroleum distillates) and certain chlorinated hydrocarbons have been shown to pose an aspiration hazard in humans. Primary alcohols and ketones have been shown to pose an aspiration hazard only in animal studies.
- b) Although a method to ascertain aspiration hazard in animals is in use, it has not been standardized yet. Positive results from animal studies can only be used in the guidance in identifying some possible aspiration hazard in humans. Hence, researchers should be cautious to evaluate the data of aspiration hazard in animals.
- c) Substances and mixtures of this hazard class are assigned to hazard categories in this hazard class on the basis of kinematic viscosity. Formula 1 shows the conversion between dynamic viscosity and kinematic viscosity:


$$\nu = \frac{\eta}{\rho} \quad \text{--- (1)}$$

In the formula:

ν – kinematic viscosity which is denominated as square millimeter per second (mm^2/s);

η – dynamic viscosity which is denominated as $\text{mPa}\cdot\text{s}$;

ρ – density which is denominated as g/cm^3 .

d) Classification of Aerosols and Gas Products

In general, aerosols/gas products are stored in containers, such as airtight containers, trigger sprayers and aerosol dispensers. The key to classify these products is whether a liquid circle is formed in the spray nozzle, which can probably be suctioned out. On one hand, if gas products sprayed out of an airtight container are in the form of fine particles, then it is impossible to form a liquid circle. On the other hand, if the products are sprayed out of an airtight container in the form of airflow, then it is possible to form a liquid circle which can then be suctioned out. Generally speaking, gas products sprayed out of a trigger sprayer or an aerosol dispenser are in the form of coarse particles; hence, it is possible to form a liquid circle which can then be suctioned out. Besides, if an aerosol dispenser may be dismantled and the product contained herein may be swallowed, then the classification of the product needs to be considered.

4.3 Environmental Hazards

4.3.1 Hazardous to the Aquatic Environment

Please refer to GB 20602 for the classification, warning labels and warning statements for Hazards to the Aquatic Environment.

4.3.2 Acute aquatic toxicity means the intrinsic property of a material to cause injury to an aquatic organism in a short-term exposure.

- a) The availability of a substance means the degree to which the substance can be dissolved or decomposed. The availability of metals means the degree to which metal ions can be decomposed from a metal compound (molecules)'s other parts.
- b) Bioavailability rate refers to the degree to which or rate at which a substance is absorbed or becomes available in a certain range in an organism. It depends on the substance's physical and chemical properties, biological anatomy and physiology, medical dynamics and routes of exposure. Availability is not a precondition for bioavailability rate.
- c) Bioaccumulation refers to the net result for the absorption, conversion and output of substances in an organism in all routes of exposure (i.e. air, water, sediments/soils and food).
- d) Bio-concentration is the net result for the absorption, conversion and output of a substance in an organism in the water.
- e) Chronic aquatic toxicity means the potential or actual properties of a material to cause adverse effects to aquatic organisms during exposures that are determined in relation to the lifecycle of the organism.
- f) Complex mixtures, also known as mixtures of many components or complex substances, are mixtures of many components of varying dissolvability, physical and chemical properties in inexact proportions. Under the most occasions, they can be described as homologous series of substances with certain lengths of carbon chains/certain range of displacement numbers.
- g) Degradation means that organic molecules are decomposed into smaller molecules and then finally into carbon dioxide, water and salt.

4.3.3 Basic Elements

a) **Basic elements comprise:**

Acute aquatic toxicity;

Potential or actual bio-accumulation;

Degradation (biologically or non-biologically) of organic chemicals; and

Chronic aquatic toxicity

- b) It would be better to use the data obtained through internationally-accepted testing methods. In general, toxicity data for freshwater and seawater species can be regarded as equivalent data, which is suggested to be in consistence with the principles of the GLP and GB/T 22272 – GB/T 22278 Serial Standards over Good Laboratory Practice (GLP).

4.3.4 Acute Aquatic Toxicity

4.3.5 Bioaccumulation Potential

4.3.6 Rapid Degradability

- a) Environmental degradation can occur biologically or non-biologically (such as

hydrolytic degradation).

- b) Non-biodegradation such as hydrolytic degradation, biodegradation, degradation in a non-aqueous medium as well as other rapid degradations proven in the environment can all be taken into consideration when defining rapid degradability.

4.3.7 Chronic Aquatic Toxicity

It is not so easy to obtain experimentally derived test data for chronic aquatic toxicity as in the case of acute aquatic toxicity. Moreover, the range of test procedures is not standardized yet.

5. Hazard Communication

5.1 Hazard Communication: Labels

5.1.1 The extent to which a label covers

The procedures for making GHS labels are stated as follows:

- a) To assign the label elements;
- b) To print symbols;
- c) To print hazard pictograms;
- d) Signal words;
- e) Hazard statements;
- f) Precautionary statements and pictograms;
- g) Product and supplier identification;
- h) A precedence scheme for multiple hazards and information;
- i) To make an arrangement for the GHS label elements; and
- j) Special label arrangement.

5.1.2 Label Elements

Label elements (symbols, signal words and hazard statements) assigned to each GHS hazard category are illustrated in the tables for the standards under each hazard class. Hazard categories reflect the standards for the unified classification.

5.1.3 To Print Symbols

The following hazard symbols are the standard ones which should be used in GHS. Apart from some new symbols for certain health hazards, such as exclamation mark, fish and tree, other symbols are the components of the standard symbol set used in the Model Regulations. Please see Figure 1.

Fire	Fire above the Circle	Explosives
		
Corrosion	Pressure Bottle	The skull and crossbones
		
Exclamation Mark	Environment	Health Hazard
		

Figure 1 the GHS Standard Symbols

5.1.4 To Print Pictograms and Hazard Pictograms

5.1.4.1 A pictogram refers to a picture representing a hieroglyphic symbol and other pictographs, such as label border, background pattern or color, to convey a specific message.

5.1.4.2 Shape and Color

5.1.4.2.1 All the hazard symbols used in the GHS should be in a square shape set at a certain site.

5.1.4.2.2 The pictograms (known as labels in transportation regulations) covered in the Model Regulations should be used in transportation. The Model Regulations set forth pictograms' specification including color, symbol, size, background contrast, supplemental safety information (such as hazard class), general format and etc., for the purpose of transportation. The standard size of a pictogram for the purpose of transportation should be at least 100mm x 100mm. However, exceptions are granted for very small packages and pressure bottles. Hence, the smaller pictograms can be used in such cases. A pictogram for the purpose of transportation consists of the symbols on the upper part of the label. In accordance with the requirement of the Model Regulations, the pictogram for the purpose of transportation

should be printed on or attached to the package which there is color difference on the background. The following example is a typical label done in accordance with the Model Regulations, which is used in identifying the hazard of flammable liquids. Please see Figure 2.



Figure 2 Pictogram for Flammable Liquids used in *the UN Model Regulations*
(Symbols: fire: black or white; background: red; the figure of 3 is at the lower part;
the minimum size: 100mm x100mm)

- 5.1.4.2.3 In the pictogram stipulated in the GHS (which is different from the Model Regulations), a black symbol and white background should be used and the red frame shall be wide enough to be eye-catching. Nevertheless, if such pictograms are used on package labels which are not for the purpose of exports, the Competent Authority can also grant suppliers or employers discretion to decide whether a black rim shall be used. Besides, under the context of other uses that the packages are not covered by the Model Regulations, the Competent Authority can also allow to use the pictograms set forth in the Model Regulations. The following example is a GHS pictogram to identify skin sensitizer (Please see Figure 3).

5.2 To Assign Label Elements

5.2.1 Information Covered in the Model Regulations for Packaging

The GHS pictograms should not appear on the labels with pictograms set forth in the Model Regulations. The GHS pictograms which are not required in the transportation of hazardous goods should be appear on bulk containers, road vehicles, or rail vehicles/tank trucks.

5.2.2 Information Required for GHS Labels (See Figure 3)



Figure 3 the Pictogram for Skin Sensitizer

5.2.2.1 Signal Words

The signal word on a label indicates the relative degree of severity a hazard and reminds the readers about potential dangers. The signal words used in the GHS are "**Danger**" and "**Warning**". "**Danger**" is used for the more severe hazards (namely it is mainly used in Categories 1 and 2), whereas "**Warning**" is used for the less severe hazards. Signal words are standardized and assigned to the GHS hazard categories, which are illustrated in the figures and tables in the Chapters for the hazard classes.

5.2.2.2 Hazard Statements

Hazard statements are standardized and assigned phrases that describe the hazard(s) as determined by hazard classification. The extent to which the hazard(s)' can be is included when appropriate. The hazard statements for each hazard category's assigned label elements are provided in each hazard chapter of the GHS.

Identification codes for the specific purpose of hazard statements and each statement are listed in the Serial Standard of *Safety Rules for Classification, Warning Labels and Warning Statements for Chemicals*. The codes for hazard statements are used as references. Such a code is not a part of the text of a hazard statement; hence, it should not replace the text of a hazard statement.

5.2.2.3 Precautionary Statements and Pictograms

A precautionary statement is a phrase and/or pictogram to supplement the hazard information by briefly providing measures to be taken to minimize or prevent adverse effects from physical, health or environmental hazards after exposure to some hazardous substances or improper storage or handling of the substances. The GHS label should include appropriate precautionary information, but the label makers or the Competent Authority are entitled to selecting precautionary information. Annexes A and B of the Standard include examples that precautionary statements can be used and examples that pictograms that can be used on labels with a permission of the Competent Authority.

5.2.2.4 Product Identification

5.2.2.4.1 A product identifier should be used on a GHS label and it should match the product identifier used on the SDS. Where a substance or mixture is covered by the UN Model Regulations on the Transport of Dangerous Goods, the UN proper shipping name should also be used on the package.

5.2.2.4.2 The label for a substance should include the chemical name of the substance. For mixtures/alloys, the label should include the chemical identities of all ingredients that contribute to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or Target Organ Systemic Toxicity (TOST), when these hazards appear on the label. Moreover, the Competent Authority may also request that all ingredients or alloy elements that may give rise to mixture or alloy hazards be listed on the label.

5.2.2.4.3 Where a substance or mixture is supplied exclusively for workplace use, the Competent Authority may give suppliers discretion to include chemical identities on the SDS, in lieu of including them on labels.

5.2.2.4.4 The Competent Authority rules for confidential business information (CBI) take priority over the rules for product identification. In other words, if a certain ingredient which is usually listed on the label meets the Competent Authority's standard on CBI, then its name cannot be listed on the label.

5.2.2.4.5 Supplier Identification

The name, address and telephone number of the manufacturer or supplier of the substance or mixture should be provided on the label.

5.3 The Precedence Scheme for Multiple Hazards and Hazard Information

Where a substance or mixture presents more than one GHS hazard, it can be subject to the following arrangements. Hence, in a scheme that specific hazards information is not provided on the label, these arrangements' applicability should be accordingly revised.

5.3.1 The Precedence Scheme for Pictograms and Symbols

For substances and mixtures covered by the UN Model Regulations, the precedence of symbols for physical hazards should follow the rules of the UN Model Regulations. For all circumstances at workplace, the Competent Authority may request to use all the symbols for physical hazards. For health hazards the following principles of precedence apply for symbols:

- a) If the skull and crossbones apply, the exclamation mark should not appear;
- b) If the corrosive symbol applies, the exclamation mark should not appear where it is used for skin or eye irritation; and
- c) If the health hazard symbol appears for respiratory sensitization, the exclamation mark should not appear where it is used for skin sensitization or for skin or eye irritation.

5.3.2 The Precedence Scheme for Signal Words

If the signal word 'Danger' applies, the signal word 'Warning' should not appear.

5.3.3 The Precedence Scheme for Hazard Statements

All assigned hazard statements should appear on the label. The Competent Authority may choose to specify the order in which they appear.

5.4 Layout of the GHS Label Elements

5.4.1 Location of the GHS information on the Label

The GHS hazard pictograms, signal word and hazard statements should be located together on the label. The Competent Authority may choose to specify the layout for the above information and precautionary information on the label or allow supplier discretion. The specific guidance and examples are stated in the standards for some

hazard classes.

5.4.2 Supplemental Information

The Competent Authority is entitled to deciding whether non-harmonized information and supplemental information not in violation with the relevant provisions of the GHS can be used. The Competent Authority may choose to specify where the information should appear on the label or allow supplier discretion. Either way, the arrangement of supplemental information should not undermine the GHS information.

5.4.3 The Use of Colors Outside Pictograms

Colors are not only used in pictograms, but also can be used in other parts of the label to meet some special label requirements. For instance, the color bands for pesticides can be used in signal words and hazard statements or used as their background or used in the way as specified by the Competent Authority.

5.5 Special Labels Arrangement

The Competent Authority may permit that some hazards information (Please see the Chapters for the details of threshold values for their hazard categories), such as carcinogenicity, reproductive toxicity and target organ systemic toxicity (TOST) after repeated exposure, should be communicated to sector/target audiences on the label and the SDS or on the SDS only. Similarly, for metals and alloys, the Competent Authority may permit to communicate hazards information to sector/target audiences on the SDS only when they are supplied in large quantities instead of being supplied in a distributed way.

5.5.1 Workplace Labels

5.5.1.1 Products falling within the scope of the GHS will carry the GHS label at the point where they are supplied to the workplace, and that label should be maintained on the supplied container in the workplace. The GHS label or label elements can also be used for workplace containers (See Annex C). However, the Competent Authority can allow employers to use alternative means of giving workers the same information in a different written or displayed format when such a format is more appropriate to the workplace and communicates the information as effectively as the GHS label. For example, label information could be displayed in the work area, rather than on the individual containers.

5.5.1.2 If hazardous chemicals are transferred into the containers or systems at workplace from original supplier containers, or chemicals are produced at workplace but not packaged in containers specifically designed for sales or supplies, the information on the GHS label should be provided to workers in an alternative way. Chemicals produced at workplace may be contained or stored in a variety of ways. For instance, small samples collected for tests or analysis, pipeline system including valves, process containers or reaction containers, brick vehicles, conveyor belts or independent solids can be stored

in bulk. When a process for batch production is in use, a blending container can be used in containing several different chemical mixtures.

5.5.1.3 Under many other circumstances, say, due to the limitation of the container's size or a process container cannot be used, it is unrealistic to develop a complete GHS label and attach it to the container. Under some situations at workplace, chemicals may be transferred from suppliers containers. Some examples of workplace situations where chemicals may be transferred from supplier containers include: containers for laboratory testing, storage vessels, piping or process reaction systems or temporary containers where the chemical will be used by one worker within a short timeframe. In the case that chemicals transferred from original containers will be put into immediate use, the information about its main ingredients should be attached; moreover, users should be reminded to directly refer to the label information and the SDS provided by suppliers.

5.5.1.4 All these schemes should ensure to convey explicit information for hazard communication. Workers should be trained to understand specific communication methods used at workplace. Examples for alternative ways include: product identification is used together with GHS symbols and other pictograms to state precautionary measures; for complex systems, a process flowchart is used together with an appropriate SDS to indicate the chemicals contained in pipelines and containers; for pipeline systems and processing equipments, the GHS symbols, colors and signal words should be shown; for fixed pipelines, permanent notices shall be used; for batch-blending containers, batch sheets or prescriptions should be attached over them; moreover, hazard symbols and product identifications should be printed on the pipelines.

5.5.2 Consumer Products Labels based on Hazard Possibility

The risk-based GHS classification standard should be used in all schemes, while the Competent Authority may authorize to use the consumer label scheme (risk-based labeling) providing information based on hazard possibility. In the latter circumstance, the Competent Authority shall develop the procedure(s) to ascertain potential exposure and risks when the products are in use. The label based on the approach provides relevant information in respect to risk identification but may not include some information related to chronic health effects [such as target organ systemic toxicity (TOST) after repeated exposure, reproductive toxicity and carcinogenicity] of consumer products in the consumer use setting. Such information will only appear on the hazard-based label.

5.5.3 Exposure Warning

If exposure warning is used, it should be in consistence with ISO 11683:1997.

5.6 Hazard Communication: Safety Data Sheet (SDS)

5.6.1 A Standard to Ensure whether an SDS should be Prepared

An SDS should be prepared for all substance or mixtures that meet the GHS harmonized standard on physical hazards, health hazards and environmental hazards as well as all mixtures comprising substances which meet the standards on carcinogenicity, reproductive toxicity and target organ systemic toxicity (TOST) and are in certain concentrations exceeding the threshold values stipulated by the standards for mixtures. Please see GB/T 16483. The Competent Authority may also request that an SDS be prepared for the mixtures not meeting the standards for hazard category but comprising hazardous substances in certain concentrations.

5.6.2 General Guidance on Preparing an SDS

5.6.2.1 Threshold Values/Concentration Limits

- a) An SDS should be prepared in accordance with the universally-accepted threshold values/concentration limits stated in Table 1.

Table 1 Threshold Values/Concentration Limits for Each Health and Environmental Hazard Class

Hazard Class	Threshold Value/Concentration Limit
Acute Toxicity	≥1.0%
Skin Corrosion/Irritation	≥1.0%
Serious Eye Damage/Eye Irritation	≥1.0%
Respiratory/Skin Sensitization	≥1.0%
Germ Cell Mutagenicity: Category 1	≥0.1%
Germ Cell Mutagenicity: Category 2	≥1.0%
Carcinogenicity	≥0.1%
Reproductive Toxicity	≥0.1%
Target Organ Systemic Toxicity (Single Exposure)	≥1.0%
Target Organ Systemic Toxicity (Repeated Exposure)	≥1.0%
Hazardous to the Aquatic Environment	≥1.0%

- b) It is possible for the existing hazard data to prove that the classification based on other threshold values/concentration limits are much more reasonable than the classification based on the universally-accepted threshold values/concentration limits stipulated on the Chapters in respect to health and environmental hazard class. When these specific threshold values are used in classification, they should also be used in the preparation of an SDS.
- c) The Competent Authority may request to prepare an SDS for the mixtures whose acute toxicity or aquatic toxicity are not classified, but they comprise substances in concentration of no less than 1% with acute toxicity or hazardous to the aquatic environment.
- d) The Competent Authority may decide not to regulate some categories within a hazard class. Under such circumstance, there is no obligation to develop an SDS.

- e) Once it is ascertained that a certain substance or mixture needs an SDS, then the information required for an SDS should be provided in accordance with the GHS requirements all the time.

5.6.2.2 Format of the SDS

The SDS should contain 16 headings. Please see Annex D.

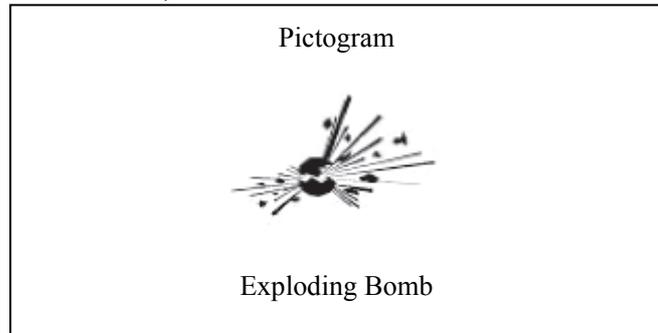
5.6.2.3 Contents of the SDS

- a) The SDS should provide a clear description of the data used to identify the hazards. If it is applicable and available, the minimum information stated in Annex B should be required in each section of the SDS. If the specific information required in a certain section is not applicable or available, it should be explicitly stated in the SDS. The Competent Authority may request to provide supplemental information.
- b) Some headings actually concerns with the national or regional information, such as “EU Commission No.” and “Occupational Exposure Limits”. Suppliers or employers should properly include the information related to the countries or regions where products are supplied in the sections of the SDS.
- c) The SDS should be prepared in accordance with the GHS requirements. Please see GB/T 16483.

Annex A
(Informative Appendix)
Examples for Precautionary Statements

A.1 an example of precautionary statement for explosives, please see Figure A.1

Explosives
(Please see 4.1.1)



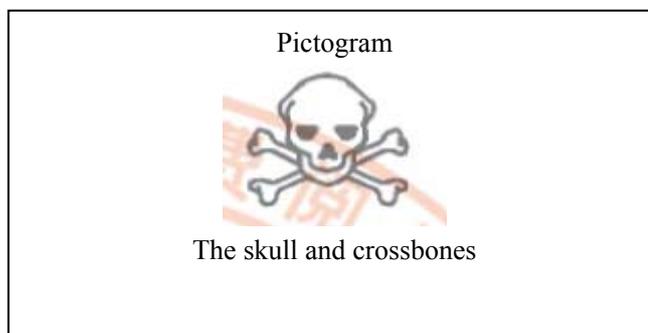
Hazard Category	Signal Word	Hazard Statement
Unstable explosive	Danger	Unstable explosive H200

Precautionary Statements			
Prevention	Response	Storage	Disposal
<p>P201 Specific instructions shall be obtained before use</p> <p>P202 Please refrain from moving it before you completely understand all the safety precautionary measures</p> <p>P281 Please use personal protection equipment as needed</p>	<p>P372 Do not fight a fire when explosives are burnt.</p> <p>P373 It may be exploded when a fire hazard occurs.</p> <p>P380 Please leave the site where a fire hazard occurs.</p>	<p>P401 Storage... ...in accordance with local/regional/national/international regulations (to be decided).</p>	<p>P501 To dispose the packaged/containers... ...in accordance with local/regional/national/international regulations (to be decided).</p>

Figure A.1

**A.2 Acute Toxicity – an example of precautionary statement for oral intake,
Please see Figure A.2**

**Acute Toxicity – Oral
(See 4.2.1)**



Hazard Category	Signal Word	Hazard Statement
1	Danger	Lethal if swallowed
2	Danger	H300

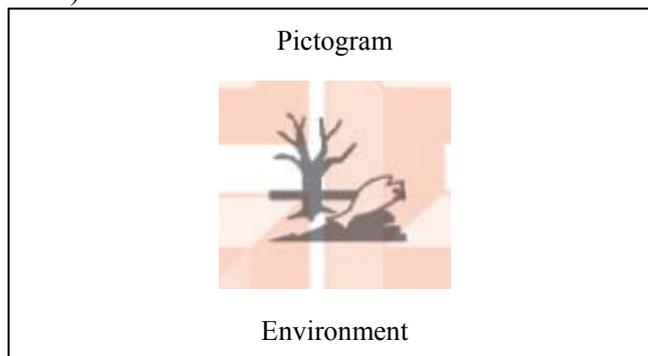
Precautionary Statements			
Prevention	Response	Storage	Disposal
<p>P264 Wash thoroughly after handling the product...</p> <p>...manufacturers/suppliers or the Competent Authority specify the parts of human body that need washing after handling the product.</p> <p>P270 No eating, drinking or smoking when using this product.</p>	<p>P301 + P310 If swallowed by mistake, call the detoxification center or a doctor immediately.</p> <p>P321 Specific treatment measures (See...on the label).</p> <p>...Please see the first aid instructions as attached.</p> <p>...Apply detoxification medicines</p>	<p>P405 Lock it up.</p>	<p>P501 To dispose the packaged/containers...</p> <p>...in accordance with local/regional/national/inter-national regulations (to be decided).</p>

	immediately if necessary.		
	P330 Wash mouth.		

Figure A.2

A.3 Hazardous to the Aquatic Environment - an example of precautionary statement for acute aquatic toxicity, Please see Figure A.3.

Hazardous to the Aquatic Environment - Acute Aquatic Toxicity
(See 4.3.1)



Hazard Category	Signal Word	Hazard Statement
1	Warning	Very toxic to aquatic life H400

Precautionary Statements			
Prevention	Response	Storage	Disposal
P273 Avoid releasing it to the environment.	P391 Collect the effluent.		P501 To dispose the packaged/containers... ...in accordance with local/regional/national/inter-national regulations (to be decided).

Figure A.3

Annex B
(Informative Appendix)
Precautionary Pictograms

B.1 Figure B.1 is quoted from The EU Council Directive 92/58/EEC (June 24th 1992)

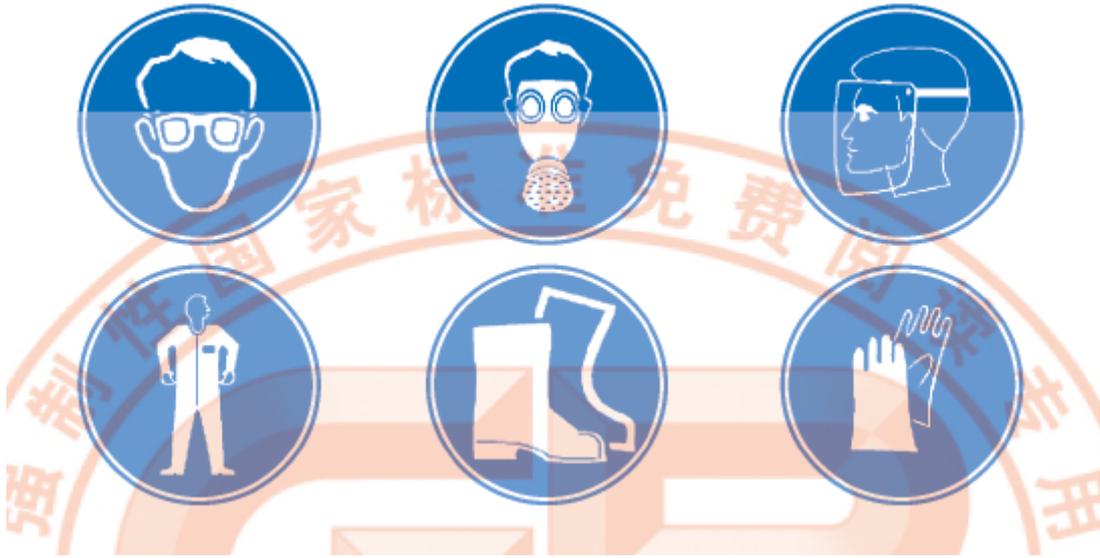


Figure B.1

B.2 Figure B.2 is quoted from South Africa Bureau of Standards (SABS 0265:1999)



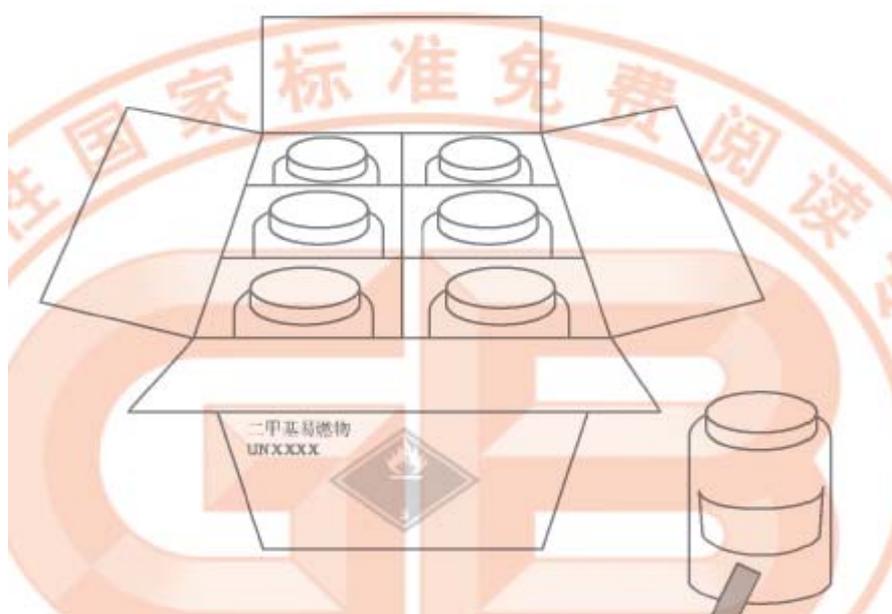
Figure B.2

Annex C
(Informative Appendix)
An Example of the GHS Label

C.1 Example: Composite containers for Flammable Liquids: Category 2. Please see Figure C.1.

C.1.1 Outer container: box¹ with the transport label for flammable liquids.

C.1.2 Inner container: plastic bottle² with the GHS hazard warning label.



Flammable Comprising Dimethyl	Product Identification (Please see 5.2.2.4)
	
Signal word (See 5.2.2.1) Hazard Statements (See 5.2.2.2)	
Precautionary Statement (See 5.2.2.3)	
Additional information requested by the Competent Authority for some circumstances.	
Supplier Identification (See 5.2.2.4)	

Figure C.1

¹ The transport symbol and the label for flammable liquids are required on the outer container in accordance with the Model Regulations.

² The pictogram for flammable liquids, stipulated on the Model Regulations, can be used as the label for inner containers to replace the GHS pictogram.

Annex D
(Informative Appendix)
Minimum information for an SDS

1.	Identification of the substance or mixture and of the supplier	<ul style="list-style-type: none"> ▪ GHS product identifier. ▪ Other means of identification. ▪ Recommended use of the chemical and restrictions on use. ▪ Supplier's details (including name, address, phone number, etc.). ▪ Emergency phone number.
2.	Hazards identification	<ul style="list-style-type: none"> ▪ GHS classification of the substance/mixture and any national or regional information. ▪ GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol, e.g., flame, skull and crossbones.) ▪ Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS.
3.	Composition/information on ingredients	<p>Substance</p> <ul style="list-style-type: none"> ▪ Chemical identity. ▪ Common name, synonyms, etc. ▪ CAS number, EC number, etc. ▪ Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance. <p>Mixture</p> <ul style="list-style-type: none"> ▪ The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cutoff levels. <p><i>NOTE: For information on ingredients, the competent authority rules for CBI take priority over the rules for product identification.</i></p>
4.	First aid measures	<ul style="list-style-type: none"> ▪ Description of necessary measures, subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact, and ingestion. ▪ Most important symptoms/effects, acute and delayed. ▪ Indication of immediate medical attention and special treatment needed, if necessary.
5.	Firefighting measures	<ul style="list-style-type: none"> ▪ Suitable (and unsuitable) extinguishing media. ▪ Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products). ▪ Special protective equipment and precautions for firefighters.
6.	Accidental	<ul style="list-style-type: none"> ▪ Personal precautions, protective equipment and emergency procedures.

	release measures	<ul style="list-style-type: none"> ▪ Environmental precautions. ▪ Methods and materials for containment and cleaning up.
7.	Handling and storage	<ul style="list-style-type: none"> ▪ Precautions for safe handling. ▪ Conditions for safe storage, including any incompatibilities.
8.	Exposure controls/personal protection.	<ul style="list-style-type: none"> ▪ Control parameters, e.g., occupational exposure limit values or biological limit values. ▪ Appropriate engineering controls. ▪ Individual protection measures, such as personal protective equipment.
9.	Physical and chemical properties	<ul style="list-style-type: none"> ▪ Appearance (physical state, color, etc.). ▪ Odor. ▪ Odor threshold. ▪ pH. ▪ melting point/freezing point. ▪ initial boiling point and boiling range. ▪ flash point. ▪ evaporation rate. ▪ flammability (solid, gas). ▪ upper/lower flammability or explosive limits. ▪ vapor pressure. ▪ vapor density. ▪ relative density. ▪ solubility(ies). ▪ partition coefficient: n-octanol/water. ▪ Auto-ignition temperature. ▪ decomposition temperature.
10.	Stability and reactivity	<ul style="list-style-type: none"> ▪ Chemical stability. ▪ Possibility of hazardous reactions. ▪ Conditions to avoid (e.g., static discharge, shock or vibration). ▪ Incompatible materials. ▪ Hazardous decomposition products.
11.	Toxicological information	<p>Concise but complete and comprehensible description of the various toxicological (health) effects and the available data used to identify those effects, including:</p> <ul style="list-style-type: none"> ▪ information on the likely routes of exposure (inhalation, ingestion, skin and eye contact); ▪ Symptoms related to the physical, chemical and toxicological characteristics; ▪ Delayed and immediate effects and also chronic effects from short- and long-term exposure; ▪ Numerical measures of toxicity (such as acute toxicity estimates).
12.	Ecological	<ul style="list-style-type: none"> ▪ Ecotoxicity (aquatic and terrestrial, where available).

	information	<ul style="list-style-type: none"> ▪ Persistence and degradability. ▪ Bio-accumulative potential. ▪ Mobility in soil. ▪ Other adverse effects.
13.	Disposal considerations	<ul style="list-style-type: none"> ▪ Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.
14.	Transport information	<ul style="list-style-type: none"> ▪ UN Number. ▪ UN Proper shipping name. ▪ Transport Hazard class(es). ▪ Packing group, if applicable. ▪ Marine pollutant (Yes/No). ▪ Special precautions which a user needs to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises.
15.	Regulatory information	<ul style="list-style-type: none"> ▪ Safety, health and environmental regulations specific for the product in question.
16.	Other information including information on preparation and revision of the SDS	

National Standard of
The People's Republic of China

General Rule for Classification and Hazard Communication of Chemicals

GB 13690 – 2009

Published by Standards Press of China (SPC)
16 Hebei Street, San Li He, Fu Xing Men Wai, Beijing 100045
Website: www.spc.net.cn
Tel: 86 10 6852 3946 6851 7548

Printed by Qinhuang Dao Printing House Ltd., Standards Press of China
Distributed by Xinhua Book Stores across the country

Book size: 880 x 1230 1/16
Printed Sheets: 1.75
Word Count: 44,000 characters



GB 13690-2009

1st ed. November 2009
1st printing, November 2009
ISBN: 155066-1-38758

**If there is any printing error,
please return your books to SPC to get corrected ones.**

All rights reserved. Legal actions will be brought against tortfeasors.

Please call us to report any tort against the book at 86 10 6853 3533.