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Replaces GB 13690-1992

General rule for classification and hazard communication of chemicals

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Foreword

Clauses 4 and 5 of this Standard are mandatory, whilst the rest are recommended.

The conformity degree of this Standard and the second revised edition of “*Globally Harmonised System of Classification and Labelling of Chemicals*” (GHS) (ST/SG/AC.10/30/Rev.2) is non-equivalent; the technical content of this Standard is identical to GHS on the basis of Standard text format conducted editing amendments in accordance with GB/T 1.1 -2000.

This Standard replaces GB 13690-1992, “Classification and labelling of hazardous chemicals in common use”.

The main differences between this Standard when compared to GB 13690-1992 are:

- the name of the standard has been changed to “General rule for classification and hazard communication of chemicals”;
- this Standard classifies chemical hazards in accordance with the requirements of GHS;
- this Standard specifies chemical hazard communication rules in accordance with the requirements of GHS.

Appendices A, B, C and D are all informative annexes.

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

The organisations that participated in the drafting of this Standard are:

Zhonghua Chemical Industry Institute of Standardisation;
Shandong Entry-Exit Inspection and Quarantine Bureau;
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This Standard was first issued in 1992.

General rule for classification and hazard communication of chemicals

1 Scope

This Standard specifies the classification and hazard communication for chemicals concerning GHS.

This Standard applies to the classification and hazard communication of chemicals. This Standard also applies to the labelling of chemical production places and 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 17519 Safety data sheet for chemical products (GB/T 17509-2008 ISO/DIS 11014:2008, IDT)

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

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

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

GB20579 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Oxidising gases

GB 20580 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Gases under pressure

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

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

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

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

GB 20585 Safety rules for classification, precautionary labelling and precautionary statements of

chemicals – Pyrophoric liquids

GB 20586 Safety rules for classification, precautionary labelling and precautionary statements of chemicals - Pyrophoric solids

GB 20587 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Substances which, in contact with water, emit flammable gases

GB 20588 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Corrosive to metals

GB 20589 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Oxidizing liquids

GB 20590 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Oxidizing solids

GB 20591 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Organic peroxides

GB 20592 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Acute toxicity

GB 20593 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Skin corrosion/ irritation

GB 20594 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Serious eye damage/ eye irritation

GB 20595 Safety rules for classification, precautionary labelling and precautionary statements of chemicals - Respiratory or skin sensitization

GB 20596 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Germ cell mutagenicity

GB 20597 Safety rules for classification, precautionary labelling and precautionary statements of chemicals - Carcinogenicity

GB 20598 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Reproductive toxicity

GB 20599 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Specific target organ systemic toxicity – Single exposure

GB 20601 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Specific target organ systemic toxicity – Repeated exposure

GB 20602 Safety rules for classification, precautionary labelling and precautionary statements of chemicals – Hazardous to the aquatic environment

GB ***** 200* Good Laboratory Practices (GLP) set Standards

ISO 11683:1997 Packaging – Tactile warnings of danger – Requirements

International Programme on Chemical Safety/ Environmental Health Criteria Document No 225, “Principles for evaluating health risks to reproduction associated with exposure to chemicals”.

3 Terms, definitions and abbreviations

The terms and definitions specified in Standards GB20576 ~ GB20599; GB20601, GB20602 transformed from GHS and the terms and definitions listed below apply to this Standard.

3.1 Alloy

A metallic material, homogeneous on a macroscopic scale, consisting of two or more elements combined so that they cannot be readily separated by mechanical means. Alloys are considered to be mixtures for the purpose of classification under GHS.

3.2 BOD/COD

Biochemical oxygen demand / chemical oxygen demand.

3.3 Chemical identity

A name that uniquely identifies a chemical. This can be a name that conforms to the nomenclature systems of the *International Union of Pure and Applied Chemistry* (IUPAC) or the *Chemical Abstracts Service* (CAS), or a technical name.

3.4 Competent authority

Any national body/bodies or authority/authorities designated or otherwise recognised as such in connection with the *Globally Harmonised System of Classification and Labelling of Chemicals* (GHS).

3.5 Compressed gas

A gas which when packaged under pressure is entirely gaseous at -50°C; this includes all gases with the critical temperature • -50°C.

3.6 EC₅₀

The effective concentration of substances that causes 50% of the maximum response.

3.7 Flash point

The lowest temperature (corrected to a standard pressure of 101.3kPa) at which the application of an ignition source causes the vapours of a liquid to ignite under specified test conditions;

3.8 Food and agriculture organisation of the UN FAO

Food and agriculture organisation of the United Nations.

3.9 Globally harmonised system of classification and labelling of chemicals GHS

Globally harmonised system of classification and labelling of chemicals.

3.10 Hazard category

The division of criteria within each hazard class, e.g. oral acute toxicity includes five hazard categories and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

3.11 Hazard class

The nature of physical, health or environmental hazard, e.g. flammable solids, carcinogen, or oral acute toxicity.

3.12 Hazard statement

A statement assigned to a hazard class and categories that describes the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard.

3.13 Initial boiling point

The temperature of a liquid at which its vapour pressure is equal to the standard pressure (101.3kPa), i.e. the first gas bubble appears.

3.14 Label

An appropriate group of written, printed or graphic information elements relating to a hazardous product, selected as relevant to the target sector(s), which is affixed to, printed on, or attached to the immediate container of a hazardous product, or to the outside packaging of a hazardous product.

3.15 Label element

One type of information that has been harmonised for use in a label, e.g. pictogram, signal words.

3.16 OECD (organisation for economic co-operation and development)

Organisation for Economic Co-operation and Development.

3.17 Recommendations on the transport of dangerous goods, model regulations

Approved by the Economic and Trade Branch of United Nation, published as an attachment to the Recommendations on the Transport of Dangerous Goods, entitled “*Recommendations on the Transport of Dangerous Goods, Model Regulations*”, and any published amendments thereto.

3.18 Pictogram

A graphic composition that may include a symbol plus other graphic elements, such as a boarder, background pattern or colour that is intended to convey specific information.

3.19 NOEC

No observed effect concentration.

3.20 *L(E)C₅₀*

LC₅₀ or EC₅₀.

3.21 *Precautionary statement*

A phrase (and/or pictogram) that describes recommended measures that should be taken to minimise or prevent adverse effects resulting from exposure to a hazardous product, or improper storage or handling of a hazardous product.

3.22 *Product identifier*

The name or number used for a hazardous product on a label or in the SDS. It provides a unique means by which the product user can identify the substance or mixture within the particular use setting e.g. transport, consumer or workplace.

3.23 *Signal word*

A word used to indicate the relative level of severity of hazard and to alert the reader to a potential hazard on the label. GHS uses “Danger” and “Warning” as signal words.

3.24 *Symbol*

A graphic element intended to succinctly convey information.

4 Classification

4.1 *Physical hazard*

4.1.1 Explosives

See GB 20576 for the classification, precautionary labelling and precautionary statements of explosives.

4.1.1.1 An explosives substance (or mixture) is a solid or liquid substance (or mixture of substances) 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 a substance or mixture of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as a result of non-detonative self-sustaining exothermic chemical reactions.

An explosives article is an article containing one or more explosive substances or mixtures.

A pyrotechnic article is an article containing one or more pyrotechnic substances or mixtures.

4.1.1.2 The class of explosives comprises:

- a) explosives substances and mixtures;
- b) explosives articles, except devices containing explosives substances or mixtures in such

quantity or of such a character that their inadvertent or accidental ignition or initiation shall not cause any effect external to the device either by projection, fire, smoke, heat or loud noise.

- c) Substances, mixtures or articles not mentioned under (a) and (b) above which are manufactured with the view to producing a practical, explosive or pyrotechnic effect.

4.1.2 Flammable gases

See GB 20577 for the classification, precautionary labelling and precautionary statements of flammable gases.

A flammable gas is a gas with a flammable range with air at 20°C and a standard pressure of 101.3kPa.

4.1.3 Flammable aerosols

See GB 20578 for the classification, precautionary labelling and precautionary statements of flammable aerosols.

Aerosols also means aerosol dispensers, are any non-refillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in gas, as a foam, paste or powder or in a liquid state or in a gaseous state.

4.1.4 Oxidising gases

See GB 20579 for the classification, precautionary labelling and precautionary statements of oxidising gases.

An oxidising gas is 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

See GB 20580 for the classification, precautionary labelling and precautionary statements of gases under pressure.

Gases under pressure are gases which are contained in a receptacle at a pressure of 200kPa (gauge) or more; or which are liquefied or liquefied and refrigerated.

They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.

4.1.6 Flammable liquids

See GB 20581 for the classification, precautionary labelling and precautionary statements of flammable liquids.

A flammable liquid is a liquid with a flash point of not more than 93°C.

4.1.7 Flammable solids

See GB 20582 for the classification, precautionary labelling and precautionary statements of flammable solids.

A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction.

Readily combustible solids are powdered, granular, or paste 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 and mixtures

See GB 20583 for the classification, precautionary labelling and precautionary statements of self-reactive substances and mixtures.

4.1.8.1 Self-reactive substances and mixtures are thermally unstable liquid or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without the involvement of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidising.

4.1.8.2 A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.

4.1.9 Pyrophoric liquids

See GB 20585 for the classification, precautionary labelling and precautionary statements of 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

See GB 20586 for the classification, precautionary labelling and precautionary statements of 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 and mixtures

See GB 20584 for the classification, precautionary labelling and precautionary statements of self-heating substances and mixtures.

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

Note: self-heating of substances or mixtures, leading to spontaneous combustion, is caused by the reaction of the substance or mixture with oxygen (in the air) and the heat developed not being conducted away rapidly enough into the surroundings. Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached.

4.1.12 Substances and mixtures which emit flammable gases when in contact with water

See GB 20587 for the classification, precautionary labelling and precautionary statements of

substances and mixtures which emit flammable gases when they come into contact with water.

Substances and mixtures which, in contact with water, emit flammable gases are solid or liquid substances or mixtures which, by interaction with water, are liable to become spontaneously flammable or give off flammable gases in dangerous quantities.

4.1.13 Oxidising liquids

See GB 20589 for the classification, precautionary labelling and precautionary statements of oxidising liquids.

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

4.1.14 Oxidising solids

See GB 20590 for the classification, precautionary labelling and precautionary statements of oxidising solids.

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

4.1.15 Organic peroxides

See GB 20591 for the classification, precautionary labelling and precautionary statements of organic peroxides.

4.1.15.1 Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxides, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxides formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:

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

4.1.15.2 An organic peroxide is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.

4.1.16 Metal corrosive substances or mixtures

See GB 20588 for the classification, precautionary labelling and precautionary statements of metal corrosive substances or mixtures.

A substance or mixture which is corrosive to metals is a substance or mixture which by chemical action will materially damage, or even destroy metals.

4.2 Health hazard

4.2.1 Acute toxicity

See GB 20592 for the classification, precautionary labelling and precautionary statements of acute toxicity.

Acute toxicity refers to adverse effects which occur following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

4.2.2 Skin corrosion/ irritation

See GB 20593 for the classification, precautionary labelling and precautionary statements of the skin corrosion/ irritation.

Skin corrosion is the production of irreversible damage to the skin; namely, visible necroses through the epidermis and into the dermis following the application of a test substance for up to 4 hours.

Corrosive reactions are typified by ulcers, bleeding, blood scabs, and by the end of observation at 14 days, by discolouration due to the blanching of the skin, complete areas of alopecia, and scars. Histopathology should be considered to evaluate questionable lesions.

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

4.2.3 Serious eye damage/ eye irritation

See GB 20594 for the classification, precautionary labelling and precautionary statements of the serious eye damage/ eye irritation.

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

Eye irritation is the production of changes in the eye following the application of test substance to the anterior surface of the eye, which are fully reversible within 21 days of application.

4.2.4 Respiratory or skin sensitisation

See GB 20595 for the classification, precautionary labelling and precautionary statements of respiratory or skin sensitisation.

4.2.4.1 A respiratory sensitiser is a substance that will lead to hypersensitivity of the airways following inhalation of the substance. A skin sensitiser is a substance that will lead to an allergic response following contact with the skin.

4.2.4.2 Sensitisation includes two phases: the first phase is induction of specialised immunological memory in an individual by exposure to an allergen. The second phase is elicitation, i.e. production of a cell-mediated or antibody-mediated allergic response by exposure of a sensitised individual to an allergen.

4.2.4.3 For respiratory sensitisation, the pattern of induction followed by elicitation phases is shared in common with skin sensitisation. For skin sensitisation, an induction phase is required in which the immune system learns to react; clinical symptoms can then arise when subsequent exposure is sufficient to elicit a visible skin reaction (elicitation phase). Consequently, predictive tests usually

follow this pattern in which there is an individual phase, the response to which is measured by a standardised elicitation phase, typically involving a patch test. The local lymph node assay is the exception, directly measuring the induction response. Evidence of skin sensitisation in humans is normally assessed using a diagnostic patch test.

4.2.4.4 Usually for both skin and respiratory sensitisation, lower levels are necessary for elicitation than are required for induction. Provisions for alerting sensitized individuals to the presence of a particular sensitizer in a mixture shall be specified.

4.2.5 Germ cell mutagenicity

4.2.5.1 See GB 20596 for the classification, precautionary labelling and precautionary statements of germ cell mutagenicity.

4.2.5.2 This hazard class is primarily concerned with chemicals that may cause mutations in the germ cells of humans that can be transmitted to the progeny. However, mutagenicity /genotoxicity tests in vitro and in mammalian somatic cells in vivo are also considered in classifying substances and mixtures within this hazard class.

4.2.5.3 In the present context, the commonly found definitions of the terms mutagenic, mutagen, mutations and genotoxic are used. A mutation is defined as a permanent change to the amount or structure of the genetic material in cell.

4.2.5.4 The term mutation applies both to heritable genetic changes that may be manifested at the phenotypic level and to the underlying DNA modifications when known (including, for example, specific base pair changes and chromosomal translocations). The term mutagenic and mutagen will be used for agents giving rise to an increased occurrence of mutations in populations of cells and/or organisms.

4.2.5.5 The more general term genotoxicity apply to agents or processes which alter the structure, information content, or segregation of DNA, including those which cause DNA damage by interfering with normal replication processes, or which in a non-physiological manner (temporarily) alter its replication. Genotoxicity test results are usually taken as indicators for mutagenic effects.

4.2.6 Carcinogenicity

4.2.6.1 See GB 20597 for the classification, precautionary labelling and precautionary statements of carcinogenicity.

4.2.6.2 The term carcinogen denotes a chemical substance or a mixture of chemical substances which induce cancer or increase the occurrence thereof. Substances which have induced benign and malignant tumours in well-performed experimental studies on animals are considered also to be presumed or suspected human carcinogens unless there is strong evidence that the mechanism of the tumour formation is not relevant for humans.

4.2.6.3 The classification of chemicals as posing a carcinogenic hazard is based on the inherent properties of the substance and does not provide information on the level of the risk of human cancer which the use of the chemical may represent.

4.2.7 Reproductive toxicity

See GB 20598 for the classification, precautionary labelling and precautionary statements of the 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 definitions presented below are adapted from those agreed in *International Programme on Chemical Safety/Environmental Health Criteria Document No 225*.

In this classification system, reproductive toxicity is subdivided under two main headings:

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

Some reproductive toxic effects cannot be assigned to either impairment or sexual function and fertility or to development toxicity. Nonetheless, chemicals with these effects would be classified as reproductive toxicants with a general hazard statement.

4.2.7.2 Adverse effects on sexual function and fertility

Any effect of chemicals that would interfere with sexual function and fertility. This includes, but is not limited to, alteration to the female or male reproductive system, adverse effects on the onset of puberty, gamete production and transport, normality of the reproductive cycle, sexual behaviour, fertility, parturition, pregnancy outcomes, premature productive senescence, or modifications to other functions that are dependent on the integrity of the reproductive system.

Adverse effects on or via lactation are also included in reproductive toxicity, but for classification purposes, such effects are treated separately. This is because it is desirable to be able to classify chemicals specifically for an adverse effect on lactation so that a specific hazard warning about these effects can be provided for lactating mothers.

4.2.7.3 Adverse effects on development of offspring

Taken in its widest sense, developmental toxicity includes any effects which interferes with normal development of the conceptus, either before or after birth, and resulting from exposure of either parent prior to conception, or exposure of developing offspring during prenatal development, or post-natally, to the time of sexual maturation. However, it is considered that classification under the heading of developmental toxicity is primarily intended to provide a hazard warning for pregnant women and men and women of reproductive capability. Therefore, for pragmatic purposes of classification, developmental toxicity essentially means adverse effects induced during pregnancy, or as a result of parental exposure. These effects can be manifested at any point in the life span of the organism.

The major manifestations of development toxicity include:

- a) death of the developing organism;
- b) structural abnormality;
- c) altered growth;
- d) functional deficiency.

4.2.8 Special target organ toxicity – Single exposure

See GB 20599 for the classification, precautionary labelling and precautionary statements of special target organ toxicity – single exposure.

4.2.8.1 The purpose of this section is to provide a means for classifying substances and mixtures that produce specific, non lethal target organ toxicity arising from a single exposure. All significant health effects that can impair function, reversible and irreversible, immediate and/or delayed and not specifically addressed in Article 4.2.1 to Article 4.2.7 are included.

4.2.8.2 Classification identifies the substance or mixture as being a specific target organ toxicant and, as such, it may present a potential for adverse health effects in people who are exposed to it.

4.2.8.3 Classification depends upon the availability of reliable evidence that a single exposure to the substance or mixture has produced a consistent and identifiable toxic effect in humans or, in experimental animals, toxicologically significant changes which have effected the function or morphology of a tissue /organ, or has produced serious changes to the biochemistry or haematology of the organism which are relevant to human health. It is recognised that human data will be the primary source of evidence for this hazard class.

4.2.8.4 Assessment should take into consideration not only sufficient changes in a single organ or biological system but also generalised changes of a less severe nature involving several organs.

4.2.8.5 Specific target organ toxicity can occur by any route that is relevant for humans, i.e. principally oral, dermal or inhalation.

4.2.9 Special target organ toxicity – Repeated exposure

See GB 20601 for the classification, precautionary labelling and precautionary statements of special target organ toxicity – repeated exposure.

4.2.9.1 The purpose of this section is to provide a means of classifying substances that produce specific target organ toxicity arising from repeated exposure. All significant health effects that can impair function, reversible and irreversible, immediate and/or delayed are included.

4.2.9.2 Classification identifies the substance or mixture as being a specific target organ toxicant and, as such, it may present a potential for adverse health effects in people who are exposed to it.

4.2.9.3 Classification depends upon the availability of reliable evidence that repeated exposures to the substance or mixture has produced a consistent and identifiable toxic effect in humans, or, in experimental animals, toxicologically significant changes which have affected the function or morphology of a tissue /organ, or has produced serious changes to the biochemistry or haematology of the organism and these changes are relevant for human health. It is recognised that human data will be the primary source of evidence for this hazard class.

4.2.9.4 Assessment should take into consideration not only sufficient changes in a single organ or biological system but also generalised changes of a less severe nature involving several organs.

4.2.9.5 Specific target organ toxicity can occur by any route that is relevant for humans, i.e. principally oral, dermal or inhalation.

4.2.10 Aspiration hazard

Note: this hazard is not yet included in a Chinese National Standard.

4.2.10.1 The purpose of this Article is to provide a means for classifying substances or mixtures that may pose an aspiration toxicity hazard to humans.

4.2.10.2 “Aspiration” means the entry of a liquid or solid chemical product 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 affects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration.

4.2.10.4 Aspiration is initiated at the moment of inspiration, in the time required to take one breath, as the causative material lodges at the crossroad of the upper respiratory and digestive tracts in the laryngopharyngeal region.

4.2.10.5 Aspiration of a substance or mixture can occur as it is vomited following ingestion. This may have consequences for labelling, particularly where, due to acute toxicity, a recommendation may be considered to induce vomiting after ingestion. However, if the substance/mixture also presents an aspiration toxicity hazard, the recommendation to induce vomiting may need to be modified.

4.2.10.6 Specific consideration

- a) A review of the medical literature on chemical aspiration revealed that 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) While a methodology for determination of aspiration hazard in animals has been utilised, it has not been standardised. Positive experimental evidence with animals can only serve as a guide to possible aspiration toxicity in humans. Particular care must be taken in evaluating animal data for aspiration hazards.
- c) The classification criteria refer to kinematic viscosity. The following provides the conversion between dynamic and kinematic viscosity:

$$\text{Dynamic viscosity (mpa x s) / density (g/ cm}^3\text{)} = \text{kinematic viscosity (mm}^2\text{ /s)}$$

- d) Classification of aerosol/mist products

Aerosol and mist products are usually dispensed in containers such as self-pressurised containers, trigger and pump sprayers. The key to classifying these products is whether a pool of product is formed in the mouth, which may be then aspirated. If the mist or aerosol from a pressurised container is fine, a pool may be formed. On the other hand, if a pressurised container dispenses a product in a stream, a pool may be formed that may then be aspirated. Usually, the mist produced by a trigger and pump sprayer is coarse and therefore a pool may be formed, which may then be aspirated. If the pump mechanism may be removed and contents may be swallowed, then the classification of the products should be considered.

4.3 Environmental hazard

4.3.1 Hazard to the aquatic environment

See GB 20602 for the classification, precautionary labelling and precautionary statements of hazard to aquatic environment.

4.3.2 Acute aquatic toxicity means the intrinsic property of a substance to be detrimental to an organism in a short-term exposure to that substance.

- a) Availability of a substance means the extent to which this substance becomes a soluble or a disaggregate species. For metal availability, the extent to which the metal ion portion of a metal (Mo) compound can disaggregate from the rest of the compound (molecule);
- b) Bioavailability (or biological availability) means the extent to which a substance is taken up by an organism, and distributed to an area within the organism. It is dependent upon physico-chemical properties of the substance, anatomy and physiology of the organism, pharmacokinetics, and route of exposure. Availability is not a prerequisite for bio availability.
- c) Bioaccumulation means the net result of uptake, transformation and elimination of a

substance in an organism due to all routes of exposure (i.e. air, water, sediment /soil and food);

- d) Bioconcentration means the net result of uptake, transformation and elimination of substance in an organism due to waterborne exposure.
- e) Chronic aquatic toxicity means the potential or actual properties of a substance to cause adverse effects to aquatic organisms during exposure which are determined in relation to the life-cycle of the organism.
- f) Complex mixtures or multi-component substances or complex substances means mixtures comprising a complex mix of individual substances with different solubilities and physico-chemical properties. In most cases, they can be characterised as a homologous series of substances with a certain range of carbon chain length/number of degree of substitution.
- g) Degradation means the decomposition of organic molecules to smaller molecules and eventually to carbon dioxide, water and salts.

4.3.3 Basic elements:

- a) the basic elements are:
 - acute aquatic toxicity;
 - potential for or actual bioaccumulation;
 - degradation (biotic or abiotic) for organic chemicals; and
 - chronic aquatic toxicity.
- b) Data from international harmonised test methods are preferred, but it has been agreed that, in general, freshwater and marine species toxicity data can be considered as equivalent data, which suggest that according to the principles of Good Laboratory Practice (GLP), comply with the serial standards such as GB***** - 200* from the Good Laboratory Practice (GLP), using the OECT Test Guidelines or equivalent test standards.

4.3.4 Acute aquatic toxicity

4.3.5 Bioaccumulation potential

4.3.6 Rapid degradability

- a) Environmental degradation may be biotic or abiotic (e.g. hydrolysis).
- b) Abiotic degradation such as hydrolysis, primary degradation, both biotic and abiotic, degradation in non-aquatic media and proven rapid degradation in the environment may all be considered in defining rapid degradability.

4.3.7 Chronic aquatic toxicity

Chronic toxicity data are less available than acute data and the range of testing procedures less standardised.

5 Hazard communication

5.1 Hazard communication: labelling

5.1.1 Labelling scope

The following sections describe the procedures for preparing labels in the GHS:




- a) allocation of label elements;
- b) reproduction of the symbols;
- c) reproduction of hazard pictograms;
- d) signal words;
- e) hazard statements;
- f) precautionary statements and pictograms;
- g) product and supplier identification;
- h) multiple hazard and precedence of information;
- i) arrangements for presenting GHS label elements;
- j) special labelling arrangements.

5.1.2 Label elements

Each hazard class details the label elements (symbol, signal word, hazard statement) that have been assigned to each of the hazard categories of the GHS are shown in table form. Hazard categories reflect the harmonised classification criteria.

5.1.3 Reproduction of the symbol

The following hazard symbols are the standard symbols which should be used in the GHS. With the exception of the new symbol which will be used for certain health hazards, the exclamation mark and the fish and tree, they are part of the standard symbol set used in the *UN Recommendations on the Transport of Dangerous Goods, Model Regulations*.

Flame	Flame over circle	Exploding bomb
		



Pictogram for flammable liquid in the UN Model Regulations (Symbol: Flame: black or white; Background: red; Figure 3 in bottom corner; minimum dimensions 100 mm × 100 mm)

		
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Figure 1

5.1.4 Reproduction of pictograms and hazard pictograms

5.1.4.1 A pictogram means a graphical composition that includes a symbol plus other graphic elements, such as a boarder, background pattern or colour that is intended to convey specific information.

5.1.4.2 Shape and colour

5.1.4.2.1 All hazard pictograms used in the GHS should be in the shape of a square set at a point.

5.1.4.2.2 For transport, the pictograms (commonly referred to as labels in transport regulations) prescribed by the *UN Model Regulations on the Transport of Dangerous Goods* should be used. The UN Model Regulations prescribe transport pictogram specifications including colour, symbols, size, background contrast, additional safety information (e.g. hazard class) and general formats. Transport pictograms are required to have minimum dimensions of 100mm by 100mm, with some exceptions for allowing smaller pictograms for very small packages and for gas cylinders. Transport pictograms include the symbol in the upper half of the label. The UN model regulations require that transport pictograms be printed or affixed to a packaging on a background of contrasting colour. An example showing a typical label for a flammable liquid hazard according to the UN Model Regulations is provided below:

5.1.4.2.3 Pictograms prescribed by the GHS (different from the *UN Recommendations on the Transport of Dangerous Goods, Model Regulations*) should have a black symbol on a white background with a red frame sufficiently wide to be clearly visible. However, when such a pictogram appears on a label for a package which will not be exported, the competent authority may choose to give suppliers and employers discretion to use a black boarder. In addition, competent

authorities may allow the use of *UN Recommendations on the Transport of Dangerous Goods, Model Regulations* pictograms in other use settings where the package is not covered by the Model Regulations. An example of a GHS pictogram used for a skin irritant is provided below:

5.2 Allocation of label elements

5.2.1 Information required for packages covered by the UN Model Regulations on the Transport of Dangerous Goods.

Where a UN Model Regulations on the Transport of Dangerous Goods pictogram appears on a label, a GHS pictogram for the same hazard should not appear. The GHS pictograms which are not required for the transport of dangerous goods should not be displayed on freight containers, road vehicles or railway wagons/tanks.

5.2.2 Information required on a GHS label



Pictogram for skin irritant

5.2.2.1 Signal words

A signal word means a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in the GHS are “Danger” and “Warning”. “Danger” is used for the more severe hazard categories (i.e. in the main for hazard categories 1 and 2), while “warning” is used for the less severe. The tables in the individual Chapters for each hazard class detail the signal words that have been assigned to each of the hazard categories of the GHS.

5.2.2.2 Hazard statements

A hazard statement means a phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard. The tables of label elements in the individual chapters for each hazard class detail the hazard statements that have been assigned to each of the hazard categories of the GHS.

Hazard statements and a code uniquely identifying each one are listed in the set of standards “*Safety Rules for Classification, Precautionary Labelling and Precautionary Statements of Chemical Product*”. The hazard statement code is intended to be used for reference purposes. It is not part of the hazard statement text and should not be used to replace it.

5.2.2.3 Precautionary statements and pictograms

A precautionary statement means a phrase (and/or pictogram) that describes recommended measures that should be taken to minimise or prevent adverse effects resulting from exposure to a hazardous product, or improper storage or handling of a hazardous product. The GHS label should include appropriate precautionary information, the choice of which is made by the labeller or the competent authority. Appendix B contains examples of precautionary statements that can be used, as well as examples of precautionary pictograms that can be used where permitted by the competent authority.

5.2.2.4 Product identifier

5.2.2.4.1 A product identifier should be used on a GHS label and 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 proper UN shipping name should be used on the package.

5.2.2.4.2 The label for a substance should include the chemical identity thereof. For mixtures or alloys, the label should include the chemical identities of all ingredients or alloying elements that contribute to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or specific target organ toxicity (STOT), when these hazards appear on the label. Alternatively, the competent authority may require the inclusion of all ingredients or alloying elements that contribute to the hazard of the mixture or alloy.

5.2.2.4.3 Where a substance or mixture is supplied exclusively for use in the workplace, the competent authority may choose to give the supplier discretion to include chemical identities on the SDS, instead of including them on labels.

5.2.2.4.4 The competent authority rules for Confidential Business Information take priority over the rules for product identification. This means that where an ingredient would normally be included on the label, if it meets the competent authority criteria for Confidential Business Information, its identity does not have to be included 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 Multiple hazards and precedence of hazard information

The following arrangements apply where a substance or mixture presents more than one GHS hazard. Therefore where a system does not provide information on the label for a particular hazard, the application of the arrangements should be modified accordingly.

5.3.1 Precedence for the allocation of symbols

For substances and mixtures covered by the *UN Recommendations on the Transport of Dangerous Goods, Model Regulations*, the precedence of symbols for physical hazards should follow the rules of the UN Model Regulations. In the workplace, the competent authority may require all symbols for physical hazards to be used. For health hazards the following principles of precedence apply:

- a) if the skull or crossbones applies, 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;

- c) if the health hazard symbol appears for respiratory sensitisation, the exclamation mark should not appear where it is used for skin sensitisation or for skin or eye irritation.

5.3.2 Precedence for allocation of signal words

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

5.3.3 Precedence for allocation of hazard statements

All assigned statements should appear on the label. The competent authority may choose to specify the order in which they appear.

5.4 Arrangements for presenting the GHS label elements

5.4.1 Location of 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 provide a specified layout for the presentation of these and for the presentation of precautionary information, or allow supplier discretion. Specific guidance and examples are provided in the chapters on individual hazard classes.

5.4.2 Supplemental information

The competent authority has the discretion to allow the use of supplemental information and non-standardised information in the GHS. The competent authority may choose to specify where this information should appear on the label or allow supplier discretion. In either approach, the placement of supplemental information should not impede identification of GHS information.

5.4.3 Use of colour outside pictograms

In addition to its use in pictograms, colour can be used on other areas of the label to implement special labelling requirements such as the use of pesticide bands for signal words and hazard statements or as background to them, or as otherwise provided for by the competent authority.

5.5 Special labelling arrangements

The competent authority may choose to allow communication of certain hazard information for carcinogens, reproductive toxicity and specific target organ toxicity through repeated exposure on the label and on the Safety Data Sheets. Or through the Safety Data Sheets alone (see specific chapters for details of relevant cut-offs for these classes). Similarly, for metals and alloys, the competent authority may choose to allow communication of the hazard information through the Safety Data Sheets alone when they are supplied in the massive, non-dispersible form.

5.5.1 Workplace labelling

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 the label should be maintained on the supplied container in the workplace. The GHS label or the label elements should also be used for workplace containers. 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 Alternative means of providing workers with information contained in GHS labels are needed usually where hazardous chemicals are transferred from an original supplier container into a workplace container system, or where chemicals are produced in a workplace but are not packaged in containers intended for sale or supply. Chemicals that are produced in a workplace may be contained or stored in many different ways such as: small samples collected for testing or analysis, piping systems including valves, process or reaction vessels, ore cars, conveyer systems or free-standing bulk storage of solids. In batch manufacturing processes, one mixing vessel may be used to contain a number of different chemical mixtures.

5.5.1.3 In many situations, it is impractical to produce a complete GHS label and attach it to the container, for example, due to container size limitations or lack of access to a process container. Some examples of workplace situations where chemicals may be transferred from supplier containers include: containers for laboratory testing or analysis, storage vessels, piping or process reaction systems or temporary containers where the chemical will be used by one worker within a short timeframe. Decanted chemicals intended for immediate use could be labelled with the main components and directly refer the user to the supplier label information and Safety Data Sheets.

5.5.1.4 All such systems should ensure that there is clear hazard communication. Workers should be trained to understand the specific communication methods used in a workplace. Examples of alternative methods include: use of product identifiers together with GHS symbols and other pictograms to describe precautionary measures; use of process flow charts for complex systems to identify chemicals contained in pipes and vessels with links to the appropriate Safety Data Sheets; use of displays with GHS symbols, colour and signal words in piping systems and processing equipment; use of permanent placarding for fixed piping; use of batch tickets or recipes for labelling batch mixing vessels and use of piping bands with hazard symbols and product identifiers.

5.5.2 Consumer product labelling based on the likelihood of injury

All systems should use the GHS classification criteria based on hazard; however, the competent authority may authorise consumer labelling systems providing information based on the likelihood of harm (risk-based labelling). In the latter case the competent authority would establish procedures for determining the potential exposure and risk for the use of product. Labels based on this approach provide targeted information on identified risks but may not include certain information on chronic health effects (e.g. specific target organ toxicity (STOT) following repeated exposure, reproductive toxicity and carcinogenicity), that would appear on a label based on hazard alone.

5.5.3 Tactile warnings

If tactile warnings are used, the technical specifications should conform to ISO 11683.

5.6 Hazard communication: Safety Data Sheet (SDS)

5.6.1 Criteria for determining whether an SDS should be produced

An SDS should be produced (see GB/T 17519) for all substances and mixtures which meet the harmonised criteria for physical, health or environmental hazards under the GHS and for mixtures which contain substances that meet the criteria for carcinogenic, toxic to reproduction or specific target organ toxicity in concentrations exceeding the cut-off limits for SDS specified by the criteria for mixtures. The competent authority may choose also to require the SDSs for mixture not meeting the criteria for classification as hazardous but which contain hazardous substances in certain

concentrations.

5.6.2 General guidance for compiling a safety data sheet

5.6.2.1 Cut-off values/concentration limits

- a) An SDS should be provided based on the generic cut-off values/concentration limits indicated in Table 1.

Table 1: Cut-off values/concentration limits for each health and environmental hazard class

Hazard class	Cut-off values/ 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)	• 1.0%
Germ cell mutagenicity (Category 2)	• 1.0%
Carcinogenicity	• 1.0%
Reproductive toxicity	• 1.0%
Specific target organ toxicity (single exposure)	• 1.0%
Specific target organ toxicity (repeated exposure)	• 1.0%
Hazardous to the aquatic environment	• 1.0%

- b) There may be some cases when the available hazard data may justify classification on the basis of cut-off values/concentration limits than the generic ones specified in the health and environment hazard class chapters. When such specific cut-off values are used for classification, they should also apply to the obligation to compile an SDS.
- c) Certain competent authorities may require SDSs to be compiled for mixtures which are not classified for acute toxicity or aquatic toxicity as a result of application of the additivity formula, but which contain acutely toxic or toxic to the aquatic environment ingredients equal or greater than 1%.
- d) Certain competent authorities may choose not to regulate certain categories within a hazard class. In such situations, there would be no obligation to compile an SDS.
- e) Once it is clear that an SDS is required for a substance or a mixture then the information required to be included in the SDS should in all cases be provided in accordance with GHS requirements.

5.2.2.2 SDS format

The information in the SDS should be provided as 16 headings, see Appendix D.

5.2.2.3 SDS content

- a) The SDS should provide a clear description of the data used to identify the hazards. The minimum information in Appendix D should be included - where applicable and available - on the SDS under the relevant headings. If specific information is not applicable or not

available under a particular subheading, the SDS should clearly state this. Additional information may be required by competent authorities.

- b) Some headings relate to information that is national or regional in nature, such as “EC number” and “occupational exposure limits”. Suppliers or employers should include information under such SDS subheadings that is appropriate and relevant to the countries or regions for which the SDS is intended and into which the product is being supplied.
- c) Guidance on the preparation of SDSs under the requirements of the GHS can be found in GB/T 17519.

A.1 Example of precautionary statement of explosive substances, see Diagram A.1

Appendix A
(Informative Annex)
Precautionary Statement

Explosive
(see 4.1.1)

Symbol
Exploding bomb

Hazard category	Signal word	Hazard statement
Unstable explosive	Danger	H200 Unstable explosive



Precautionary statements			
Prevention	Response	Storage	Disposal
P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P281 Use personal protective equipment as required.	P372 Explosion risk in case of fire. P373 DO NOT fight fire when fire reaches explosives. P380 Evacuate area.	P401 Storein accordance with local/regional/national/international regulations (to be specified).	P501 Dispose of contents/container toin accordance with local/regional/national/international regulations (to be specified).

A.2 Example of oral precautionary statement - acute toxicity, see Diagram A.2

ACUTE TOXICITY - ORAL
(see 4.2.1)

Symbol
Skull and crossbones

Hazard category	Signal word	Hazard statement
1	Danger	H300 Fatal if swallowed
2	Danger	



Precautionary statements			
Prevention	Response	Storage	Disposal
P264 Wash ...thoroughly after handling. ... Manufacturer/supplier or the competent authority to specify parts of the body to be washed after handling. P270 Do not eat, drink or smoke when using this product.	P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see ... on this label) ... Reference to supplemental first aid instruction. - if immediate administration of antidote is required. P330 Rinse mouth.	P405 Store locked up.	P501 Dispose of contents/container to... ... in accordance with local/regional/national/international regulations (to be specified).

A.3 Example of precautionary statement of hazardous to the aquatic environment - acute hazard. See

HAZARDOUS TO THE AQUATIC ENVIRONMENT - ACUTE HAZARD

(see 4.3.1)

Diagram A.3

Symbol Environment

Hazard category	Signal word	Hazard statement
1	Warning	H400 Very toxic to aquatic life



Precautionary statements			
Prevention	Response	Storage	Disposal
P273 Avoid release to the environment. <i>- if this is not the intended use.</i>	P391 Collect spillage.		P501 Dispose of contents/container to... ... in accordance with local/regional/national/international regulations (to be specified).

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Appendix B
(Informative Annex)
Precautionary Pictograms

Diagram B.1

From European Union (Council Directive 92/58/EEC of 24 June 1992)



Figure B.1

Diagram B.2

From South African Bureau of Standards (SABS 0265:1999)

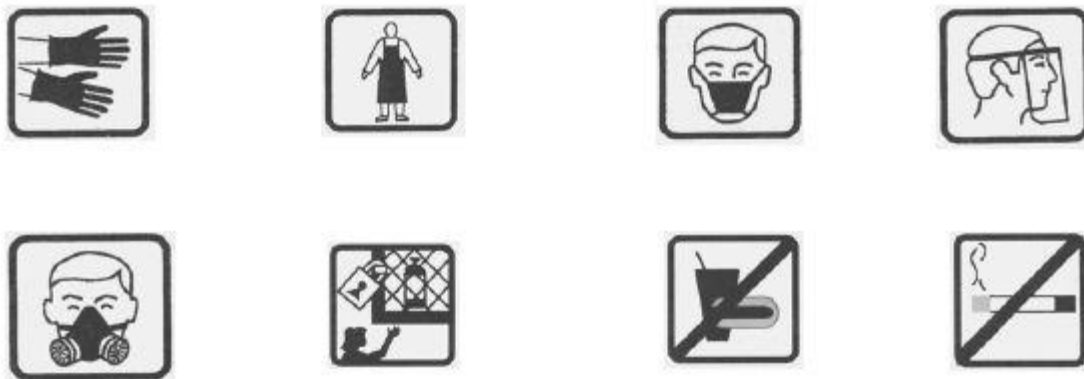


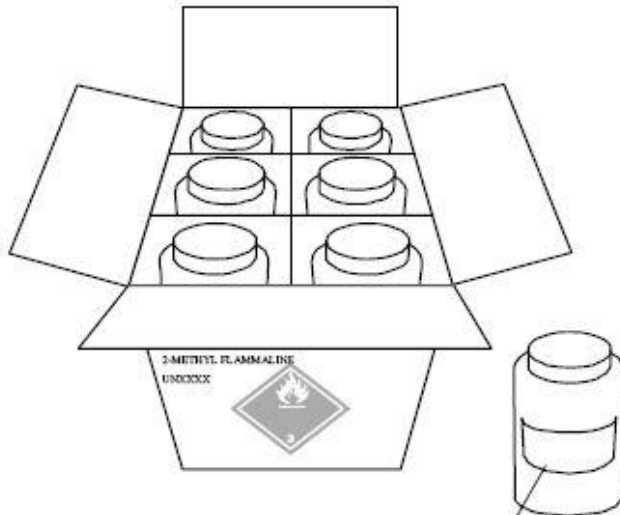
Figure B.2


Appendix C
(Informative Annex)

Example of Arrangement of the GHS Label

C.1 Example. Combination packaging for a category 2 flammable liquid.

- C.1.1 Outer Packaging: Box with a flammable liquid transport label*
- C.1.2 Inner Packaging: Plastic bottle with GHS hazard warning label*



2-METHYL FLAMMALINE	Product identifier (see 5.2.2.4)
	SIGNAL WORD (see 5.2.2.1)
	Hazard statements (see 5.2.2.2)
Precautionary statements (see 5.2.2.3) Additional information as required by the competent authority as appropriate.	
Supplier identification (see 5.2.2.4)	

* Only the transport markings and labels for flammable liquid specified in the "Model Regulations" are required for outer packagings.

** A flammable liquid pictogram as specified in the " Model Regulations" may be used in place of the GHS pictogram shown on the inner packaging label.

Appendix D
(Informative Annex)

Minimum Information of Safety Data Sheet (SDS)

1	Identification of the chemical substance or compound and supplier	<ul style="list-style-type: none"> • GSH product identifier; • Other means of identification; • Recommended use of the chemical and restrictions on use; • Supplier's details (including name, address and phone numbers etc.) • Emergency phone number.
2	Hazard identification	<ul style="list-style-type: none"> • GHS classification of the substance/ mixture and any information on country/region; • 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 (for example: dust explosion hazards), or other hazards which are not covered in GHS classification.
3	Composition /information on ingredients	<p>Substances:</p> <ul style="list-style-type: none"> • Chemical identity of the substance; • Common name(s), synonym(s) of the substance; • CAS number and other unique identifiers for the substance; • 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"> • Within the meaning of GHS, the chemical identities, concentration or concentration ranges of all hazardous ingredients are present above their cut-off levels; • Note: for ingredient proportion information, the appropriate competent national authority rules for confidential business information take priority over the rules for product identification.
4	First-aid measures	<ul style="list-style-type: none"> • Description of necessary first-aid measures, provide first-aid instructions by relevant routes of exposure, e.g. inhalation, skin, eye and ingestion; • Most important symptoms /effects, acute and delayed; • Indication of immediate medical attention and special treatment needed, if necessary.
5	Fire-fighting measures	<ul style="list-style-type: none"> • Suitable (unsuitable) extinguishing media; • Specific hazards arising from the chemical (such as the characters of the hazardous combustion products); • Special protective action for fire-fighters.
6	Accidental release measures	<ul style="list-style-type: none"> • Personal precautions, protective equipment and emergency; • 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 control/ personal protection	<ul style="list-style-type: none"> • Control parameters, such as occupation exposure limits or biological exposure limits; • Appropriate engineering controls; • Individual protection measures, such as personal protective equipment.
9	Physical and chemical	<ul style="list-style-type: none"> • Appearance (physical state, colour etc.);

	properties	<ul style="list-style-type: none"> • Odour; • Odour threshold; • Ph value; • Melting point/freezing point; • Initial boiling point and boiling range; • Flash point; • Evaporation rate; • Flammability (solid, gas); • Upper/lower flammability or explosive limits; • Vapour pressure; • Vapour 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 (static discharge, vibration or shock); • Incompatible materials; • Hazardous decomposition products.
11	Toxicological information	<p>A concise but complete and comprehensible description of the various toxicological (health) effects, and the available data used to identify those effects, should include:</p> <ul style="list-style-type: none"> • Information on the likely routes of exposure through ingestion, inhalation, or skin/eye exposure; • 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 information	<ul style="list-style-type: none"> • Toxicity (aquatic and/ or terrestrial organisms) , if there is any; • Persistence and degradability; • Bioaccumulative potential; • Mobility in soil; • Other adverse effects.
13	Disposal consideration	<ol style="list-style-type: none"> 1. Information of the substances and their safe handling, and disposal methods, including any of the containers.
14	Transport information	<ol style="list-style-type: none"> 2. UN Number; 3. UN Proper Shipping Name; 4. Transport hazard class(es); 5. Packing group, if applicable; 6. Marine pollutant(s) (yes/no); 7. When transported indoor or outdoor, the special precautions for users.
15	Regulation information	<ol style="list-style-type: none"> 8. Safety, health and environmental regulations specific for the product in question.
16	Other information, includes information relevant to the preparation of SDS (Safety Data Sheet)	