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Safety data sheet for chemical products — Content and order of sections

Fiches de données de sécurité pour les produits chimiques — Contenu et plan type

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Contents

Page

Foreword iv
Introduction v
1 Scope 1
2 Normative reference 1
3 Terms and definitions 1
4 General 3
5 Contents and general layout of an SDS 4
Annex A (normative) **Instruction for the compilation and completion of an SDS** 6
Bibliography 13

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11014 was prepared by Technical Committee ISO/TC 47, *Chemistry*.

This first edition of ISO 11014 cancels and replaces the first edition of ISO 11014-1:1994, which has been technically revised to align it with GHS:2007 [2].

Introduction

The safety data sheet (SDS) for chemical products gives information on the safety, health and environmental protection aspects of these substances or mixtures. The SDS supplies, for these aspects, basic knowledge of the chemical products, and recommendations on protective measures and emergency actions. In some countries, this sheet is called a material safety data sheet (MSDS). Throughout this International Standard, the term SDS is used.

The SDS is a means of transferring essential hazard information (including information on transport, handling, storage and emergency actions) from the supplier of a chemical product to the recipient of the chemical product. It may also be used to transfer this information to institutions, services and other bodies that play a role in dealing with the chemical product.

The objective of this International Standard is to create consistency in providing information on safety, health and environmental matters for chemical products. In order to establish uniformity, certain requirements have been laid down as to how information on the chemical product shall be given (for instance the wording, numbering and sequence of the headings).

This International Standard provides flexibility to accommodate different text-processing/transmission systems.

The predecessor to this International Standard, ISO 11014-1:1994, has been applied worldwide since its publication.

In 1992, the UN Conference on the Environment and Development (UNCED) adopted Agenda 21, in which UNCED recommended a globally harmonized system of classification and labelling of chemicals (GHS [2]) including safety data sheets as one of the six areas for action identified in Chapter 19 on environmentally sound management of toxic chemicals. It includes guidance on the preparation of safety data sheets.

Some of the regional and national standards on SDS have been revised to be in line with the GHS.

The systematic review of ISO 11014-1:1994, conducted in 2006, resulted in the committee decision to revise. Accordingly, this International Standard has been developed by aligning the predecessor text with the GHS as regards hazard communication.

ISO 11014-2 was never published. Hence this International Standard is designated as the first edition of ISO 11014.

It does not necessarily reflect or represent the different international, regional, national or local regulatory requirements that may be specific for certain regions/countries/states. It is therefore recommended that reviews outlining the different international, regional, national or local regulatory requirements relevant to SDSs be made available to those who prepare SDSs.

The provision of this knowledge to SDS authors is intended to promote the establishment and acceptance of a unique SDS per chemical product in different regions/countries/states, enabling fully consistent information to be provided.

The obligations of the recipient of an SDS are beyond the scope of this International Standard. Some of them are included, however, to clearly differentiate between the obligations of the SDS and those of the recipient of the SDS.

Safety data sheet for chemical products — Content and order of sections

1 Scope

This International Standard defines sections, content, and general format of the safety data sheet (SDS) for chemical products.

This International Standard does not define a fixed format, nor does it include a blank SDS.

2 Normative reference

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

ISO 80000-9, *Quantities and units — Part 9: Physical chemistry and molecular physics*

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1
chemical product
substance or mixture

3.2
exposure control
full range of precautionary measures to protect a user of a **chemical product** (3.1)

3.3
GHS classification
classification of substances and mixtures by the harmonized criteria in the *Globally harmonized system of classification and labelling of chemicals*[2] according to their physical, health and environmental hazards

3.4
harm
physical injury or damage to health of people, or damage to property or the environment

[ISO/IEC Guide 51:1999[1], definition 3.3]

3.5
hazard
potential source of **harm** (3.4)

[ISO/IEC Guide 51:1999[1], definition 3.5]

3.6
hazard statement
statement assigned to a hazard class and category that describes the nature of the **hazard** (3.5) of a hazardous product, including, where appropriate, the degree of hazard

[GHS:2007 [2], 1.2].

3.7
intended use
use of a **chemical product** (3.1), process or service in accordance with information provided by a **supplier** (3.18)

NOTE Adapted from ISO/IEC Guide 51:1999 [1], 3.13.

3.8
label element
one type of information that has been harmonized for use in a label

EXAMPLES Pictogram, signal word.

NOTE Adapted from GHS:2007 [2], 1.2.

3.9
mixture
mixture or solution composed of two or more substances in which they do not react

[GHS:2007 [2], 1.2].

3.10
pictogram
graphical composition that may include a **symbol** (3.19) plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information

[GHS:2007 [2], 1.2].

3.11
precautionary statement
phrase (and/or pictogram) that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous **chemical product** (3.1), or improper storage or handling of a hazardous **chemical product** (3.1)

NOTE Adapted from GHS:2007 [2], 1.2.

3.12
reasonably foreseeable misuse
use of a **chemical product** (3.1), process or service in a way not intended by a **supplier** (3.18) but which may result from readily predictable human behaviour

NOTE Adapted from ISO/IEC Guide 51:1999 [1], 3.14.

3.13
recipient
party receiving a **chemical product** (3.1) for industrial or professional use, such as storage, handling, processing or packaging, from a **supplier** (3.18)

3.14
risk
combination of the probability of occurrence of **harm** (3.4) and the severity of that **harm** (3.4)

[ISO/IEC Guide 51:1999[1], definition 3.2]

3.15
safety
freedom from unacceptable **risk** (3.14)

[ISO/IEC Guide 51:1999 [1], definition 3.1]

3.16
signal word
word used to indicate the relative level of severity of **hazard** (3.5) and alert the reader to a potential hazard on the label

EXAMPLES In the GHS, “danger” and “warning” are used as signal words.

NOTE Adapted from GHS:2007 [2], 1.2.

3.17
substance
chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition

[GHS:2007 [2], 1.2].

3.18
supplier
party responsible for making a **chemical product** (3.1) available to a **recipient** (3.13)

3.19
symbol
graphical element intended to succinctly convey information

[GHS:2007 [2], 1.2].

4 General

An SDS applies to a chemical product as a whole.

Information contained in an SDS is non-confidential information on composition and ingredients may be given in a different way, provided Clause A.4 is observed.

Any supplier should provide a complete SDS to the recipient and shall report relevant information on safety, health and environment. The supplier shall keep the SDSs up to date and provide the recipient with the latest edition.

The recipient of an SDS is responsible for: acting in accordance with a risk assessment in regard of the conditions of chemical product use; taking necessary precautionary measures in a given work situation; and keeping users informed appropriately about hazards relevant to their individual workplace. When formulating specific instructions for the workplace, the recipient should consider the general recommendations of relevant SDSs.

Since an SDS is merely chemical product related, it cannot take into account all the possible situations which may arise at any given workplace. Therefore an SDS only constitutes a part of the information necessary to establish a safety programme.

Comprehensive information about a substance or mixture should be provided by an SDS for use in workplace chemical control regulatory frameworks.

When a chemical product is a mixture, it is not necessary to produce individual SDSs corresponding to each relevant ingredient. Instead, a single SDS for a mixture may be produced and provided. Where information on each ingredient constituting the chemical product is useful, it should be provided.

5 Contents and general layout of an SDS

An SDS shall provide the following 16 document headings and relevant information about a chemical product. Text of the headings, numbering and sequence shall not be altered.

1) Chemical product and company identification
2) Hazards identification
3) Composition/information on ingredients
4) First-aid measures
5) Fire-fighting measures
6) Accidental release measures
7) Handling and storage
8) Exposure controls and personal protection
9) Physical and chemical properties
10) Stability and reactivity
11) Toxicological information
12) Ecological information
13) Disposal considerations
14) Transport information
15) Regulatory information
16) Other information

A specific serial number combined with SDS validity area identification should be entered for easier identification by an author.

Under each of the 16 document headings, relevant information shall be stated. If this information is not available, then the reason for non-availability shall be stated. With the exception of heading 16, "Other information", blanks shall not be left. In an SDS, the source of information need not necessarily be provided. Nonetheless, the source should preferably be provided to increase confidence in the information.

The 16 sections corresponding to the 16 document headings shall be completed in accordance with Annex A.

These 16 sections may be subdivided by means of subheadings. However, the subheadings shall not be numbered.

The 16 sections shall be separated clearly. The headings and subheadings shall be presented in a conspicuous way.

When subheadings or items are given, they shall be given in the sequence specified in Annex A.

Every page of an SDS shall include the name of the chemical product as used on the label, and shall be dated and numbered. The date indicated shall be the latest revision date. The page numbering system should include the total number of pages or should indicate the last page as such.

The name of the chemical product shall be the systematic chemical name or the trivial, common or generic chemical name as used on the label. If the systematic chemical name is long, it may be abbreviated, with an explanation of the abbreviation used being entered under section 1 or section 3.

Where a specific serial number and revision date (version number) are written on the first page of an SDS, only the serial number and page may be entered on every page.

The original preparation date as well as the date of any revision should be entered on the first page of an SDS.

Texts in an SDS should be written in a clear and concise manner. Commonly used phrases are recommended. An SDS should be in a language acceptable to the recipient.

Annex A
(normative)

Instruction for the compilation and completion of an SDS

A.1 General

This annex gives guidelines for the compilation and completion of SDSs. Its purpose is to ensure that the content of each of the sections listed enables recipients to take the necessary measures relating to safety, protection of health at the workplace, and protection of the environment.

— The 16 sections of an SDS shall be completed in accordance with the recommendations and requirements of this annex.

— This annex provides the main items which are used to complete the 16 sections. While this annex provides examples of the items which can be entered in an SDS, other items may also be used.

— These main items may be used as subheadings in an SDS. The recommended subheadings appear in italics under the headings to Clauses A.2 to A.17 for each section.

— Information not specifically relevant to one of the items/subheadings mentioned in this annex, but relevant to the SDS, may be stated under an additional subheading.

— For a given chemical product, not all of the items/subheadings listed have to be used and completed, since some of them are optional.

A.2 Section 1 — Chemical product and company identification

This section shall state the *identification of the product* as used on the label. It is recommended to also state the supplier product code, where it accompanies the product.

The *name, address* and *telephone number* of the supplier shall be stated. The *emergency telephone number* should be given. *Fax number* and *e-mail address* may also be given.

Recommended uses and *restrictions on use* of the chemical products should be stated.

A.3 Section 2 — Hazards identification

It is recommended to summarize clearly and concisely the *important hazards* and adverse effects of the chemical product on human health and the environment, and physical and chemical hazards, such as *chemical product-specific hazards*, where appropriate.

If a chemical product is classified in accordance with the *GHS classification*, this section shall provide its hazard class and category in the GHS as well as the GHS label elements that are pictograms or symbols, signal word(s), hazard statement(s) and precautionary statement(s). Pictograms or hazard symbols may be provided as graphical reproduction of the symbols in black and white or as the name of the symbol, e.g. “flame” and “skull and crossbones”. It is also recommended to state other hazards which do not result in GHS classification, e.g. dust explosion hazard. Any adaptation of the GHS classification should be stated clearly in this section (e.g. by describing an applicable regulation/standard), since a country/region may adopt its own building blocks in accordance with the approach specified in the GHS[2].

Important symptoms and an *outline of an anticipated emergency* may also be stated.

A.4 Section 3 — Composition/information on ingredients

This section shall state whether the chemical product is a substance or a mixture.

In the case of a substance, the *systematic chemical name* (e.g. IUPAC name, CAS name) or the *trivial, common or generic name(s)* shall be given.

The Chemical Abstract Service Registry Number (*CAS number*) and *other identifiers*, where available, should be given.

Where a substance is classified hazardous in accordance with the GHS, the *systematic chemical name* (e.g. IUPAC name, CAS name) or *trivial, common or generic name* and *concentration range* or *concentration ranges* of all hazardous ingredients including impurities and stabilizing additives which contribute to classification of the substance should also be indicated.

In the case of mixtures, it is not necessary to give the full composition.

If the ingredients which are *hazardous* within the meaning of the GHS are present above their cut-off levels, the chemical identity and concentration or concentration ranges of all the relevant ingredients shall be given. When hazardous ingredients are identified, their systematic chemical names (e.g. IUPAC names, CAS names) or trivial, common or generic names and their concentration or concentration ranges should be provided.

A.5 Section 4 — First-aid measures

This section shall state the first-aid measures to be taken, if necessary. It shall state which actions have to be avoided at all costs. The information should be readily understandable by the person adversely affected and/or the first-aider.

The information shall be subdivided according to the different exposure routes, i.e. *inhalation*, *skin contact*, *eye contact* and *ingestion*.

A brief description of the *anticipated acute effects*, *anticipated delayed effects* and *most important symptoms/effects* should be given here. However, a detailed description of symptoms and effects should be given under section 11 (see Clause A.12).

If appropriate, advice for the *protection of first-aiders* and/or special *notes to an attending physician* may be included here.

A.6 Section 5 — Fire-fighting measures

This section shall state which *extinguishing media* are suitable and also, if appropriate, which extinguishing media are unsuitable.

Specific hazards arising from the chemical product (e.g. nature of any hazardous combustion products) should be indicated here.

Specific extinguishing methods and any special protective equipment required should be indicated under *precautions for fire-fighters*.

A.7 Section 6 — Accidental release measures

This section shall contain information on:

— *personal precautions, protective equipment*, and *emergency procedures;*

— *environmental precautions;*

— *methods and materials for containment* and *methods and materials for cleaning up (recovery, neutralization and disposal,* if different from section 13).

Secondary disaster prevention measures should be included.

A.8 Section 7 — Handling and storage

— *Handling*

This subsection shall describe *precautions for safe handling* of a chemical product. They shall include suitable *technical measures* such as prevention of exposure of the handler to the chemical product and prevention of fire and explosion as well as suitable *precautions* such as *local/total ventilation* and prevention of aerosol and dust. They shall also include specific handling precautions for *prevention of contact* with incompatible substances or mixtures.

— *Storage*

This subsection shall describe *conditions for safe storage* (suitable storing conditions and unsuitable storing conditions). They shall include suitable *technical measures* and measures for separation from *incompatible substances and mixtures.* Information on *packaging material* (recommended material and unsuitable material) shall be included.

A.9 Section 8 — Exposure controls and personal protection

Permissible concentration such as occupational exposure limit values or biological limit values should be given.

If appropriate, *engineering controls* to reduce exposure should be given. The information provided here should complement that provided under section 7 (see Clause A.8).

If possible, the permissible concentration should be dated and its source cited. Information on the recommended test method and its source should also be provided.

This section shall also contain recommendations on appropriate *personal protective equipment*, such as that for:

— *respiratory protection;*

— *hand protection;*

— *eye protection;*

— *skin and body protection.*

The type of protective equipment and specifically designated material (e.g. nitrile rubber gloves) should be indicated.

For a chemical product that only poses a hazard under special conditions, such as large volume, high concentration, high temperature and high pressure, specific precautions for these conditions should be stated.

A.10 Section 9 — Physical and chemical properties

Where applicable, this section shall provide information on:

— appearance of a chemical product, e.g. *physical state*, *form* and *colour;*

— *odour*;

— *pH*, with indication of the concentration;

— *melting point/freezing point;*

— *boiling point, initial boiling point and boiling range;*

— *flashpoint;*

— upper/lower flammability or *explosive limits*;

— *vapour pressure;*

— *vapour density;*

— density/relative *density;*

— *solubility(ies);*

— n-*octanol/water partition coefficient;*

— *auto-ignition temperature;*

— *decomposition temperature.*

Where applicable, information should be provided on:

— *odour threshold;*

— *evaporation rate;*

— *flammability* (soil, gas);

— *viscosity*.

Other data relevant to the safe use of the chemical product, such as radioactivity or bulk density, should also be specified.

Units shall be expressed in accordance with the SI system, as specified in ISO 1000 and ISO 80000-9.

Other units may also be given, but only in addition to the SI units.

If appropriate, the method used in the determination of a property should be identified.

A.11 Section 10 — Stability and reactivity

This section shall describe the *chemical stability* and *hazardous reactions* occurring under specific conditions.

This section shall contain information on:

— *conditions to avoid* (e.g. static discharge, shock or vibration);

— *incompatible materials;*

— anticipated *hazardous decomposition products* other than those usually produced, such as carbon monoxide, carbon dioxide and water.

The original intended use and reasonably anticipated misuse should be considered.

A.12 Section 11 — Toxicological information

This section shall contain a concise but complete and comprehensible description of the various toxicological (health) effects of the chemical product, which can arise if the user comes into contact with it.

The description should include:

— *acute toxicity*;

— *skin irritation/corrosion*;

NOTE "Skin corrosion" is synonymous with "skin burning".

— *eye damage/irritation*;

— *respiratory or skin sensitization*;

— *reproductive cell mutagenicity*;

— *carcinogenicity*;

— *reproductive toxicity*;

— *specific target organ toxicity — single exposure*;

— *specific target organ toxicity — repeated exposure*;

— *aspiration hazard*.

NOTE "Aspiration hazard" is synonymous with "inhalation hazard".

The description may list:

— *toxicokinetics, metabolism and distribution*.

Describe data on *in vitro* mutagenicity, such as the Ames test, under *reproductive cell mutagenicity*.

If appropriate, distinction shall be made between effects due to single exposure, repeated exposure and continuous exposure. If appropriate, delayed and immediate effects shall be mentioned separately.

Symptoms related to numerical measures of toxicity (such as acute toxicity estimate), as well as the physical, chemical and toxicological characteristics, should be included in potential adverse effects.