

Chapter 4: HAZARD COMMUNICATION

The text of this chapter represents the agreement reached on a harmonised hazard communication system as part of the work on the GHS, with minor editorial changes. Additional explanatory text has been added in some sections in order to provide guidance for the reader on how to interpret the GHS agreed text. Where this is the case, the text is italicised and placed in a box to differentiate it from the agreed GHS text.

OBJECTIVES AND SCOPE

1. One of the objective of the work on the GHS has been the development of a harmonised hazard communication system including labelling, safety data sheets and easily understandable symbols, based on the classification criteria developed by the focal points within the IOMC Co-ordinating Group for the Harmonisation of Chemical Classifications Systems, CG/HCCS. This work has been carried out under the auspices of the ILO, by the ILO Working Group on Hazard Communication. The specific Terms of Reference and Membership of the Working Group are provided in Annex 1. In addition the principles contained in the IOMC CG/HCCS Terms of Reference and the document “Description and Further Clarification of the Anticipated Application of the GHS (also referred to as “The Scope Document”)” also applied to the work on harmonisation of hazard communication (see Chapter 2).

Application of the Harmonised Hazard Communication System

- ~~2. The harmonised system for hazard communication includes the appropriate labelling tools to convey information about each of the hazard classes and categories in the GHS. The use of symbols, signal words or hazard statements other than those which have been assigned to each of the GHS hazard classes and categories would be contrary to harmonisation. ~~There can however be some flexibility in how the GHS is applied in different use settings, to take account of the needs of the different target audiences.~~~~
- 2.
3. The ILO Working Group considered the application of the General Principle described in the IOMC CG/HCCS Terms of Reference as it applies to hazard communication and recognised that there will be circumstances where the demands and rationale of systems may warrant some flexibility in whether to incorporate certain hazard classes and categories for certain target audiences.
4. For example, the scope of the UN RTDG encompasses only the most severe hazard categories of the acute toxicity hazard class. This system would not label substances or mixtures falling within the scope of the less severe hazard categories (i.e. those falling within the oral range > 300mg/kg). However, should the scope of that system be amended to incorporate substances and mixtures falling in these less severe hazard categories, they should be labelled with the appropriate GHS labelling tools. The use of different cut-offs to determine which products are labelled in a hazard category would be contrary to harmonisation.
5. It is recognised that the UN RTDG model regulations provide label information primarily in a graphic form because of the needs of its target audiences. Therefore the UN RTDG may choose

not to include signal words and hazard statements in the model regulations as part of the information provided on the label.

Terminology

6. A description of common terms and definitions related to hazard communication is included in Annex X on Terminology.

Target audiences

7. The needs of the target audiences that will be the primary end-users of the harmonised hazard communication scheme have been identified. Particular attention was given to a discussion of the manner in which these target audiences will receive and use the information conveyed about hazardous chemicals. Factors discussed include the potential use of products, availability of information other than the label and the availability of training.
8. It was recognised that it is difficult to completely separate the needs of different target audiences. For example, both workers and emergency responders use labels in storage facilities, and products such as paints and solvents are used both by consumers and in workplaces. That said, there are certain characteristics which are particular to the different target audiences. The following paragraphs in this section consider the target audiences and the type of information they need.

Workplace

9. Employers and workers need to know the hazards specific to the chemicals used and or handled in the workplace, as well as information about the specific protective measures required to avoid the adverse effects that might be caused by those hazards. In the case of storage of chemicals, potential hazards are minimised by the containment (packaging) of the chemical, but in the case of an accident, workers and emergency responders need to know what mitigation measures are appropriate. Here they may require information which can be read at a distance. The label, however, is not the sole source of this information, which is also available through the SDS and workplace risk management system. The latter should also provide for training in hazard identification and prevention. The nature of training provided and the accuracy, comprehensibility and completeness of the information provided on the SDS may vary. However, compared to consumers for example, workers can develop a more in depth understanding of symbols and other types of information.

Consumers

10. The label in most cases is likely to be the sole source of information readily available to the consumer. The label, therefore, will need to be sufficiently detailed and relevant to the use of the product. There are considerable philosophical differences on the approach to providing information to consumers. Labelling based on the likelihood of injury (i.e. risk communication) is considered to be an effective approach in this respect by some consumer labelling systems, whilst others take account of the 'right to know' principle in providing information to consumers which is solely based on the products hazards. Consumer education is more difficult and less efficient than education for other audiences. Providing sufficient information to consumers in the simplest and most easily understandable terms presents a considerable challenge. The issue of comprehensibility is of particular importance for this target audience, since consumers may rely solely on label information.

Emergency Responders

11. Emergency responders need information on a range of levels. To facilitate immediate responses, they need accurate, detailed and sufficiently clear information. This applies in the event of an accident during transportation, in storage facilities or at workplaces. Fire fighters and those first at the scene of an accident for example, need information that can be distinguished and interpreted at a distance. Such personnel are highly trained in the use of graphical and coded information. However, emergency responders also require more detailed information about hazards and response techniques, which they obtain from a range of sources. The information needs of medical personnel responsible for treating the victims of an accident or emergency may differ from those of fire fighters.

Transport (UN RTDG model regulations)

12. The UN RTDG model regulations cater for a wide range of target audiences although transport workers and emergency responders are the principal ones. Others include employers, those who offer or accept dangerous goods for transport or load or unload packages of dangerous goods into or from transport vehicles, or freight containers. All need information concerning general safe practices that are appropriate for all transport situations. For example, a driver will have to know what has to be done in case of an accident irrespective of the substance transported: (e.g. report the accident to authorities, keep the shipping documents in a given place, etc.) Drivers may only require limited information concerning specific hazards, unless they also load and unload packages or fill tanks etc. Workers who might come into direct contact with dangerous goods, for example on board ships, require more detailed information.

Comprehensibility

13. Comprehensibility of the information provided has been one of the most important issues addressed in the development of the hazard communication system. The aim of the harmonised system is to present the information in a manner that the intended audience can easily understand. The GHS identifies some guiding principles to assist this process:
 - Information should be conveyed in more than one way.
 - The comprehensibility of the components of the system should take account of existing studies and literature as well as any evidence gained from testing.
 - The phrases used to indicate degree (severity) of hazard should be consistent across different hazard types.
14. The latter point was subject to some debate concerning the comparison of severity between long-term effects such as carcinogenicity and physical hazards such as flammability. Whilst it might not be possible to directly compare physical hazards to health hazards, it may be possible to provide target audiences with a means of putting the degree of hazard into context and therefore convey the same degree of concern about the hazard.

Comprehensibility testing methodology

15. A preliminary review of the literature undertaken by the University of Maryland indicated that common principles related to comprehensibility could be applied to the development of the harmonised hazard communication scheme. The University of Cape Town developed these into a comprehensive testing methodology to assess the comprehensibility of the hazard communication system. In addition to testing individual label components, this methodology considers the comprehensibility of label components in combination. This was considered particularly important to assess the comprehensibility of warning messages for consumers where there is less reliance on training to aid understandability. The testing methodology also includes a means of assessing SDS comprehensibility. A summary description of this methodology is provided in Annex ~~6X~~.

Translation

16. Options for the use of textual information present an additional challenge for comprehensibility. Clearly words and phrases need to retain their comprehensibility when translated, whilst conveying the same meaning.. The IPCS Chemical Safety Card Programme has gained experience of this in translating standard phrases in a wide variety of languages. The EU also has experience of translating terms to ensure the same message is conveyed in multiple languages e.g. hazard, risk etc. Similar experience has been gained in North America where the North American Emergency Response Guidebook, which uses key phrases, is available in a number of languages.

Standardisation

17. To fulfil the goal of having as many countries as possible adopt the system, much of the GHS is based on standardised approaches to make it easier for companies to comply with and for countries to implement the system. Standardisation can be applied to certain label elements – symbols, signal words, statements of hazard, precautionary statements – and to label format and colour and to SDS format. Development of the GHS employed a clear mechanism for the identification and development of options for the standardised elements.

Application of standardisation in the harmonised system

18. For labels, the hazard symbols, signal words and hazard statements have all been standardised and assigned to each of the hazard categories. These standardised elements should not be subject to variation, and should appear on the GHS label as indicated in the Chapters for each hazard class in this document. For safety data sheets, the Section below provides a standardised format for the presentation of information. Whilst precautionary information was considered for standardisation, there was insufficient time to develop detailed proposals. However, there are examples of precautionary statements and pictograms in Annex 3 and it remains a goal to develop them into fully standardised label elements.

Use of non-standardised or supplemental information

19. There are many other label elements which may appear on a label which have not been standardised in the harmonised system. Some of these clearly need to be included on the label, for example precautionary statements. Additional information may be required by competent authorities, or suppliers may choose to add supplementary information on their own initiative. In order to ensure that the use of non-standardised information does not lead to unnecessarily wide variation in information or undermine GHS information, the use of supplementary information should be limited to the following circumstances:

- the supplementary information provides further detail and does not contradict or cast doubt on the validity of the standardised hazard information, or;
- the supplementary information provides information about hazards not yet incorporated into the GHS.

In either instance, the supplementary information should not lower standards of protection.

20. The labeller should have the option of providing supplementary information related to the hazard, such as physical state or route of exposure, with the hazard statement rather than in the supplementary information section on the label, see also paragraph 45.

Updating Information

21. All systems should specify a means of responding in an appropriate and timely manner to new information and updating labels and SDS information accordingly. The following are examples of how this could be achieved.

General guidance on updating of information

Suppliers should respond to “new and significant” information they receive about a chemical hazard by updating the label and safety data sheet for that chemical.. New and significant information is any information that changes the GHS classification of the chemical and leads to a resulting change in the information provided on the label or any information concerning the chemical and appropriate control measures that may affect the SDS. This could include, for example, new information on the potential adverse chronic health effects of exposure as a result of recently published documentation or test results, even if a change in classification may not yet be triggered.

Updating should be carried out promptly on receipt of the information that necessitates the revision, The competent authority may choose to specify a time limit ~~up to 12 months~~ within which the information should be revised. ~~Some examples of updating requirements used in existing systems include 3 months (Canada), x months EU, 90 days US, etc~~” This applies only to labels and SDS for products that are not subject to an approval mechanism such as pesticides. In pesticide labelling systems, where the label is part of the product approval mechanism, suppliers cannot update the supply label on their own initiative. However when the products are subject to the transport of dangerous goods requirements, the label used should be updated on receipt of the new information, as above.

Suppliers should also periodically review the information on which the label and safety data sheet for a chemical is based, even if no new and significant information has been provided to them in respect of that chemical. This will require e.g. a search of chemical hazard databases for new information. The competent authority may choose to specify a time ~~(typically 3 – 5 years)~~ from the date of original preparation, within which suppliers should review the labels and SDS information. ~~Examples of such time limits are 3] [4] [5] years from date of preparation.~~

Confidential Business Information

22. Systems adopting the GHS should consider what provisions may be appropriate for the protection of confidential business information (CBI). Such provisions should not compromise the health and safety of workers or consumers, or the protection of the environment. As with other parts of the GHS, the rules of the importing country should apply with respect to CBI claims for imported chemicals.
23. Where a system chooses to provide for protection of confidential business information, competent authorities should establish appropriate mechanisms, in accordance with national law and practice, and consider:
 - whether the inclusion of certain chemicals or classes of chemicals in the arrangements is appropriate to the needs of the system;
 - what definition of "confidential business information" should apply, taking account of factors such as the accessibility of the information by competitors, intellectual property rights and the potential harm disclosure would cause to the employer or supplier's business; and
 - appropriate procedures for the disclosure of confidential business information, where necessary to protect the health and safety of workers or consumers, or to protect the environment, and measures to prevent further disclosure.
24. Specific provisions for the protection of confidential business information may differ among systems in accordance with national law and practice. However, they should be consistent with the following general principles:
 - a) For information otherwise required on labels or safety data sheets, CBI claims should be limited to the names of chemicals, and their concentrations in mixtures. All other information should be disclosed on the label and/or safety data sheet, as required.
 - b) Where CBI has been withheld, the label or chemical safety data sheet should so indicate.
 - c) CBI should be disclosed to the competent authority upon request. The competent authority should protect the confidentiality of the information in accordance with applicable law and practice.
 - d) Where a medical professional determines that a medical emergency exists due to exposure to a hazardous chemical or a chemical mixture, mechanisms should be in place to ensure timely disclosure by the supplier or employer or competent authority of any specific confidential information necessary for treatment. The medical professional should maintain the confidentiality of the information.
 - e) For non-emergency situations, the supplier or employer should ensure disclosure of confidential information to a safety or health professional providing medical or other safety and health services to exposed workers or consumers, and to workers or workers' representatives. Persons requesting the information should provide specific reasons for the disclosure, and should agree to use the information only for the purpose of consumer or worker protection, and to otherwise maintain its confidentiality.
 - f) Where non-disclosure of CBI is challenged, the competent authority should address such challenges or provide for an alternative process for challenges. The supplier or

employer should be responsible for supporting the assertion that the withheld information qualifies for CBI protection.

~~28. The following provides some~~ examples of how provisions for the protection of confidential business information could operate in practice [are provided in Annex 2](#) to this chapter.

Training

25. Training users of hazard information is an integral part of hazard communication. Systems should identify the appropriate education and training for GHS target audiences who are required to interpret label and/or SDS information and to take appropriate action in response to chemical hazards. Training requirements should be appropriate for and commensurate with the nature of the work or exposure. Key target audiences for training include workers, emergency responders, and those involved in the preparation of labels, SDS and hazard communication strategies as part of risk management systems. Others involved in the transport and supply of hazardous chemicals also require training to varying degrees. In addition systems should also consider strategies required for educating consumers in interpreting label information on products that they use.

Larry Stoffman's comment:

Is there to be a separate chapter on training strategies?

If not, we should expand this to discuss capacity building strategies, and perhaps refer to the UNITAR project, as well as the websites and contacts for the GHS subcommittee and the ILO. We should also differentiate between worker and consumer training strategies. In worker training, resources include government, employers and trade unions. In addition, time on the job is required for jobsite specific training. In addition we should differentiate between education in the main principles and components of GHS, including understanding the key components of both the label and the SDS, and training in safe handling and disposal procedures. Further, we should recommend to the GHS subcommittee that a training guide be developed for workers and consumers, with the assistance of UNITAR and ILO. This guide would prepare basic text and illustrations of the GHS, the main symbols/pictograms, the meaning of them, key signal words, review of the components of the SDS and their significance. There are many examples of this type of material already developed in existing systems, all of which will soon be modified when the GHS is implemented. I agree that it is too early to go into such detail in this document, but should be an identified priority for implementation work.

Peter Robson's comment:

I believe that we should not attempt to provide any detailed guidance here regarding training, since this is a very large topic to cover. References to existing information could be provided, and as Larry suggests, the new GHS subcommittee could consider whether they wish to undertake anything more ambitious.

LABELLING PROCEDURES

26. The following sections describe the procedures for preparing labels in the GHS, comprising the following:
- i. Allocation of label elements to communicate the harmonised classification information.
 - ii. Reproduction of the hazard symbol.
 - iii. Reproduction of the hazard pictogram.
 - iv. Signal words

- v. Hazard statements
- vi. Precautionary information
- vii. Product and supplier identification.
- viii. Multiple hazards and precedence of information.
- ix. Arrangements for presenting the label elements on the label.
- x. Special labelling arrangements









Should we put in a decision logic for labelling here? Peter Robson's comment: yes, we should attempt to produce one – I haven't thought how complex this would be.

Allocation of Label Elements

27. The tables in the individual Chapters for each hazard class detail the label elements (symbol, signal word, hazard statement) that have been assigned to each of the hazard categories of the GHS (these reflect the harmonised classification criteria). There are special arrangements, which apply to the use of certain mixture concentrations in the GHS to take account of the information needs of different target audiences. These are further described in paragraph 55.

Reproduction of the symbol

28. 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 the standard symbol set used in the UN RTDG model regulations.

Flame	Flame over circle	Exploding bomb	Corrosion
			
Gas cylinder	Skull and crossbones	Exclamation Mark	Environment
			

New Symbol*

* The new symbol which will be used for certain health hazards will be referred to the IOMC coordinating group for consideration by September 7, 2001.

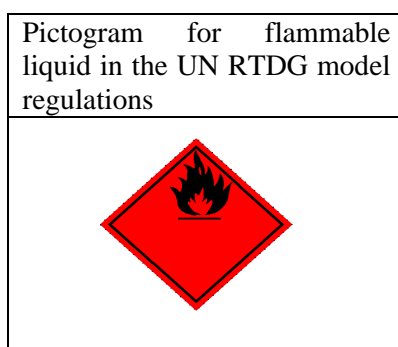
Pictograms

29. A pictogram, as defined in the GHS definitions (Section ...) means a composition that includes a symbol plus other graphic elements, such as a border, background pattern or colour that is intended to convey specific information.

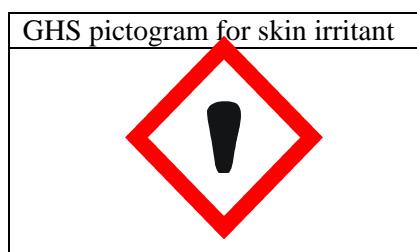
Reproduction of the hazard pictogram

Shape and colour

30. All hazard pictograms used in the harmonised system should be in the shape of a square set at a point.
31. Pictograms prescribed by the UNRTDG Model regulations will use a background and symbol colour as specified by those regulations. An example of the pictogram used in the UNRTDG for flammable liquid is provided below.



32. Pictograms prescribed by the GHS but not the UN RTDG 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 border. In addition, Competent Authorities may allow the use of UN RTDG pictograms in other use settings where the package is not covered by the UN RTDG. An example of a GHS pictogram used for a skin irritant is provided below.



Packages covered by the UN RTDG model regulations and other labelling systems

33. Where a UN RTDG pictogram appears on a label, a GHS pictogram for the same hazard should not appear.

Signal words

A signal word, as defined in the GHS definitions (Section ...), 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 use of a signal word is optional for acute toxicity level 5. 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.

Hazard statements

A hazard statement, as defined in the GHS definitions (Section ...), 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 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.

Precautionary statements and pictograms

A precautionary statement, as defined in the GHS definitions (Section ...), means a phrase (and/or pictogram) that describes recommended measures that should be taken to minimize 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 with the labeller. Annex 3 contains examples of precautionary statements which can be used, and also examples of precautionary pictograms which can be used where allowed by the Competent Authority.

Product and supplier identification.

Product identifier

A product identifier, as defined in Annex 2 on Terminology, means 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.

34. 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 RTDG, the UN proper shipping name should also be used on the package.

35. The label for a substance should include the chemical identity of the substance. For mixtures or alloys, the label should include the chemical identities of all ingredients or alloying elements that contribute to acute toxicity, skin or eye corrosion, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitisation, or TOST, 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.
36. Where a substance or mixture is supplied exclusively for workplace use, the competent authority may choose to give suppliers discretion to include chemical identities on the SDS, in lieu of including them on labels.
37. The competent authority rules for CBI 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 CBI, its identity does not have to be included on the label.

Supplier Identification

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

Multiple hazards and precedence of hazard information.

39. The following arrangements apply where a substance or mixture presents more than one GHS hazard. It is without prejudice to the building block principle described in Chapter 2. Therefore where a system does not provide information on the label for a particular hazard, the application of the arrangements should be modified accordingly.

Precedence for the allocation of symbols

40. For substances and mixtures covered by the UN RTDG, the precedence of symbols for physical hazards should follow the rules of the UN RTDG. In workplace situations, the Competent Authority may require all symbols for physical hazards to be used. For health hazards the following principles of precedence apply:
 - if the skull and crossbones applies, the exclamation mark should not appear;
 - if the corrosive symbol applies, the exclamation mark should not appear where it is used for skin or eye irritation;
 - if the new health hazard symbol appears for respiratory sensitisation, the exclamation mark should not appear where it is used for dermal sensitisation or for skin or eye irritation.

Precedence for allocation of signal words

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

Precedence for allocation of hazard statements

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

Arrangements for presenting the label elements on the label.

Location of GHS information on the label

43. 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.
44. There have been some concerns about how the label elements should appear on different packagings. Specific guidance and examples are provided in Annex 4 of this Chapter.

Supplemental information

45. The competent authority has the discretion to allow the use of supplemental information subject to the parameters outlined in paragraphs 19-20. 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.

Use of colour outside pictograms

46. 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 the pesticide bands in the FAO Labelling Guide, for signal words and hazard statements or as background to them, or as otherwise provided for by the competent authority.

Special arrangements

47. The competent authority may choose to allow communication of certain hazard information for carcinogens, reproductive toxicity and target organ systemic toxicity repeat exposure on the label and on the SDS, or through the SDS alone (see the OECD Integrated Document for details of relevant cut-offs for these classes).
48. Similarly, for metals and alloys, the competent authority may choose to allow communication of the hazard information through the SDS alone when they are supplied in the massive, non-dispersible, form.

Workplace labelling

49. 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 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. The following provides further examples of where alternative arrangements may be appropriate.

Alternative means of providing workers with the information contained in GHS labels are needed usually where hazardous chemicals are transferred from an original supplier container into a workplace container or 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.

In many situations, it is impractical to produce a complete GHS label and attach it to the container, due, for example, 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 should be labelled with the main components and directly refer the user to the supplier label information and SDS.

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 SDS; 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 labeling batch mixing vessels and use of piping bands with hazard symbols and product identifiers.

Consumer Product Labelling Based on the Likelihood of Injury

62. All systems should use the GHS classification criteria. Consistent with the IOMC scope paper, however, some consumer labelling systems will provide label information based solely on hazard, while other consumer labelling systems may provide 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 the product. Labels based on this approach provide targeted information on identified risks but may not include certain information on chronic health effects (e.g. TOST following repeated exposure, reproductive toxicity and carcinogenicity), that would appear on a label based on hazard alone. A general explanation of the broad principles of risk-based labelling is contained in Annex 5.

Tactile warnings

63. If tactile warnings are used, the technical specifications shall conform with EN ISO standard 11683 (1997 edition) relating to tactile warnings of danger.

ANNEX 1

**TERMS OF REFERENCE AND MEMBERSHIP OF THE ILO WORKING GROUP ON
HAZARD COMMUNICATION**

ANNEX 2

OUTLINE OF THE OPERATION OF CBI UNDER EXISTING PRE-GHS SYSTEMS THAT MEET THE GENERAL PRINCIPLES OUTLINED IN PARAGRAPH 27

EU:

U.S.

Australia

Canada:

These above systems illustrate systems that require registration, some that do not. Systems that have an official reviewing agency, those that do not, systems that restrict CBI to narrow classes of chemicals based on hazard, and those that do not. They all follow the principles identified in the GHS

ANNEX 3

PRECAUTIONARY STATEMENTS

This annex lists statements that are frequently used in existing systems to provide precautionary information. It is not an exhaustive list, rather it is designed to provide examples of statements that may be appropriate to the label provided for the specific substance or mixture. Systems or suppliers should make use of those which are most appropriate to the particular situation.

Where a statement contains words in brackets, any of the words in brackets may be used in addition to the core information contained in the phrase, or instead of some of this information, as appropriate. e.g. “Keep away from heat” or “Keep away from heat and sparks” or “Keep away from heat, sparks, and flame” or “Keep away from sparks and flame”, etc. Similarly, statements from different groups may be used in combination, e.g. “Keep away from heat and ignition sources and store in a cool well-ventilated place”

The IPCS Chemical Safety Cards Programme includes a compilers guide, which provides some explanation of precautionary statements and the context for their use.

1. Statements for physical hazards

1.1. Flammable liquids, solids and gases

Avoidance of ignition sources

Keep away from fire [– No Smoking]

Keep away from heat, [sparks] [and flame] [– No Smoking]

Keep away from heat and ignition sources [– No Smoking].

Keep away from sources of ignition – No Smoking

Avoid contact with heat and ignition sources [and oxidizers] [– No Smoking].

No open flames, no sparks and no smoking

Take precautionary measures against static charges

Do not use sparking tools.

Keep from direct sunlight.

Precautions regarding the container

Keep container closed

Keep container tightly closed

Keep container closed when not in use.

Store in a tightly closed container

Keep only in the original container

Storage of the container or package

Keep in a cool place

Keep at a temperature not exceeding⁰C

Decomposes below boiling point at [] ⁰C

Decomposes below melting point at [] ⁰C

Keep container/package in a well-ventilated place

Keep container/package tightly closed in a cool [, well-ventilated] place

Keep only in the original container/package in a cool well-ventilated place.

Keep container/package tightly closed and in a well-ventilated place.

Store in a cool/low-temperature, well-ventilated [dry] place [away from heat and ignition sources].

Store and transport according to packing list of dangerous chemicals.

Explosive limit ranges

Storage separately from incompatible materials

Do not store and transport with oxidizers etc.

Separate from oxidisers [oxygen], [explosives], [halogens], [compressed air] [acids], [bases] [and food chemicals] etc. in transport [and storage].

Do not store and transport with oxidizers, [acids] [and bases] etc.

Fire-fighting

Use CO₂, dry chemical, or foam.

In case of fire, use [..]

1.2. Pyrophoric Liquids and Solids

Use any combination of the phrases in 1.1 plus one or more of the following:

Keep under [insert name of inert gas]

Do not allow contact with air.

Protect from light, moisture and damage.

1.3. Self-heating Substances

Use any combination of the phrases in 1.1, in particular phrases relating to storage separately from incompatible materials, plus the following:

Keep at a temperature not exceeding [].

1.4. Substances which, in contact with water, emit flammable gases

Use any combination of the phrases in 1.1 as appropriate, plus one or more of the following:

Keep away from water

Keep container dry

Never add water to this product

Keep from any possible contact with water

No contact with water

Do not add water to contents while in a container because of violent reaction and possible flash fire

Store in a dry place, [protect from moisture].

Protect from moisture and damage

Handle under nitrogen, [protect from moisture]..

1.5. Oxidising liquids, solids and gases

Use any combination of the phrases in 1.1 relating to precautions regarding the container and storage of the container or package as appropriate, plus one or more of the following:

Keep away from combustible material

Keep away from (incompatible material to be specified by manufacturer)

Keep from contact with clothing and other combustible materials to avoid fire

Prevent contamination with readily oxidizable materials and polymerization accelerators.

Do not store near combustible materials.

Drying of this product on clothing or combustible materials may cause fire.

Put safety caps and shockproof rubber rings on cylinders in transport.
Do not store and transport with flammable/combustible materials etc.
Isolate from reducers and flammable/ combustible materials etc in storage.

Do not store and transport with halogens and acids etc.
Separate from reducers and finely powdered metals etc in storage and transport.

1.6. Organic peroxides

Use any combination of the phrases in 1.1 relating to precautions regarding the container and storage of the container or package as appropriate, plus one or more of the following:

Keep away from heat
Keep away from combustible material
Keep away from (incompatible material to be specified by manufacturer)
Keep from contact with clothing and other combustible materials to avoid fire
Prevent contamination with readily oxidizable materials and polymerization accelerators.
Do not store near combustible materials.
Drying of this product on clothing or combustible materials may cause fire.
Put safety caps and shockproof rubber rings on cylinders in transport.
Do not store and transport with flammable/combustible materials etc.
Isolate from reducers and flammable/ combustible materials etc in storage.

Do not store and transport with halogens and acids etc.
Separate from reducers and finely powdered metals etc in storage and transport

1.7. Self reactive substances

Keep away from heat
Keep at temperature not exceeding°C
Keep away from fire
Keep away from heat, [sparks] [and flame]
Keep away from heat and ignition sources
Keep away from sources of ignition
Avoid contact with heat and ignition sources
No open flames, no sparks and no smoking
Keep away from combustible material

Keep away from (incompatible material to be specified by manufacturer)
Keep from contact with clothing and other combustible materials to avoid fire
Prevent contamination with readily oxidizable materials and polymerization accelerators.
Do not store near combustible materials.
Drying of this product on clothing or combustible materials may cause fire.
Put safety caps and shockproof rubber rings on cylinders in transport.
Do not store and transport with flammable/combustible materials etc.

1.8. Explosives

Use any combination of the phrases in 1.1 relating to avoidance of sources of ignition, plus one or more of the following:

Avoid shock, [impact],[friction] [and rough handling].
Keep away from fire
No open flames, no sparks and no smoking
Keep away from sources of ignition – No Smoking
Do not use sparking tools.
Store and transport according to packing list of dangerous chemicals.
Above [] explosive vapour/air mixtures may be formed
Gas/air or vapour/air mixtures are explosive
Finely dispersed particles form explosive mixtures with air
Do not use compressed air for filling, discharging or handling.

1.9 Corrosive to metal

Store and transport according to packing list of dangerous chemicals.
Suitable materials for containment (storage and transport) are listed in the (M)SDS
Avoid contact with skin and eyes
Do not get on skin
Do not get in eyes

2.) Statements to prevent potential misuse and exposure to health

2.1 Ventilation controls

Use only in well ventilated areas

Use only with adequate ventilation [or closed system ventilation].

Do not enter areas where used or stored until adequately ventilated.

Use only with adequate ventilation to keep exposures (airborne levels of dust, fume, vapour etc) below recommended exposure limits.

Use adequate ventilation to remove vapours (fumes, dust etc).

Use adequate ventilation and/or engineering controls in high temperature processing to prevent exposure to vapours.

Prevent vapour build up by providing adequate ventilation during and after use.

[Use with] [ventilation], local exhaust ventilation [or breathing protection].

Do not use in areas without adequate ventilation.

.

2.2. Hygiene measures

When using do not [smoke[, [eat] [or drink]

Do not eat, drink or smoke during work.

Wash hands before eating [, drinking] [or smoking].

Wash thoroughly after handling.

Avoid all contact. Strict hygiene.

Avoid contact with skin and eyes

Do not get on skin

Do not get in eyes

2.3. Personal Protective Equipment

.

Wear suitable [protective clothing] [, gloves] [and eye/face protection].

Wear protective clothing and gloves (specify protective clothing and type of gloves)

Wear protective eyewear (goggles, face shield, or safety glasses)

Wear appropriate personal protective equipment, avoid direct contact.

2.4. Respiratory Protective Equipment

In case of insufficient ventilation, wear suitable respiratory equipment.

During fumigation/spraying, wear suitable respiratory equipment (appropriate wording to be specified by the manufacturer).

Have available emergency self-contained breathing apparatus or full-face airline respirator when using this chemical.

Always wear a self-contained breathing apparatus or full-face airline respirator when using this chemical.

Wear a mask or pesticide respirator jointly approved by the Mine Safety and Health Administration and NIOSH [US EPA]

Wear (identify specific respiratory device approved by the Mine Safety and Health Administration and NIOSH). [US EPA]

Use NIOSH approved respiratory protection (US requirements).

3. Statements explaining appropriate action in the event of an accident

3.1. Spills

In event of a spill, evacuate danger area.

In event of a spill, consult an expert.

To clean the floor and all objects contaminated by this material use (to be specified by manufacturer).

Cover with absorbent or contain. Collect and dispose.

Cover the spilled material with [...].

Absorb remaining liquid in sand or inert absorbent and remove to safe place.

Treat remaining liquid [with.....].

Wash away spilled liquid [remainder] with plenty of water.

Do NOT wash away into sewer.

Avoid run off to waterways and sewers.

Clean up spill immediately.

Allow product to cool/solidify and pick up as a solid.

Sweep up and remove immediately.

Use non-sparking equipment when picking up flammable spill, [remove all ignition sources.

Ensure adequate ventilation to remove vapours, fumes, dust etc.

Collect leaking liquid in sealable (metal/plastic) containers.

Cautiously neutralize spilled liquid.

Collect leaking and spilled liquid in sealable (metal/plastic) containers as far as possible.

Do not place spilled materials back in the original container.

Vacuum spilled material.

Sweep spilled substances into [] containers.

Sweep spilled substances into [] containers; if appropriate moisten first to prevent dusting. Cautiously neutralize remainder. Then wash away with plenty of water.

Carefully collect remainder.

Wipe up remainder in [] then remove to safe place.

Do NOT absorb in saw-dust or other combustible absorbents.

NEVER direct water jet on liquid.

3.2. Fire-fighting

In case of fire, use (indicate the precise type of fire fighting equipment).

If water increases the risk, never use water.

Use CO₂, dry chemical, or foam.

Water can be used to cool and protect exposed material.

Allow gas to burn if flow cannot be shut off.

Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases, extinguish with (select appropriate medium from list)

In case of fire in the surroundings: all extinguishing agents allowed.

In case of fire in the surroundings: (use the appropriate agent).

Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

3.3. First aid

3.3.1. General

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

3.3.2. Accident caused by inhalation

In case of accident by inhalation, remove casualty to fresh air and keep at rest.

Obtain medical attention immediately if inhaled.

[Remove person to] fresh air, [rest].

Remove to fresh air immediately. Get medical attention immediately.

If signs/symptoms continue, get medical attention.

If breathing has stopped, apply artificial respiration.

If breathing is labored, administer oxygen.

Half upright position.

Artificial respiration if indicated.

No mouth-to-mouth respiration.

If inhaled, give oxygen or artificial respiration, call a physician.

If inhaled, give amylis nitris, call a physician.

3.3.3. Accident caused by ingestion

Obtain medical attention immediately if ingested

If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

If swallowed, seek medical advice immediately and show this container or label.

If swallowed, rinse mouth with water (only if the person is conscious).

If swallowed, and the victim is conscious and alert, induce vomiting immediately, as directed by medical personnel.

[Do not induce vomiting]. [If conscious, give 2 glasses of water. Get immediate medical attention].

Drink (one glass) (two glasses) of water. Call a physician (or poison control center immediately).

Rinse mouth.

Give a slurry of activated charcoal in water to drink.

Induce vomiting (only in conscious persons).

Do NOT induce vomiting.

Give nothing to drink.

Give plenty of water to drink.

Rest.

Wear protective gloves when inducing vomiting

If ingested, drink lukewarm, induce vomiting, gastric irrigate, call a physician

If ingested, drink lukewarm, induce vomiting, gastric irrigate, catharsis, call a physician.

If ingested, drink plant oil, induce vomiting, call a physician.

If ingested, wash out mouth with water, drink milk or egg white.

If ingested, flush the material in stomach with 5% sodium thiosulfate.

If ingested, flush the material in stomach with 1% sodium thiosulfate.

If ingested, induce vomiting, flush the material in stomach with sodium bicarbonate solution.

If ingested, induce vomiting, clyster and flush the material in stomach with plant oil.

If ingested, flush the material in stomach immediately with 2% copper sulfate.

If ingested, flush the material in stomach with sodium sulfate solution, catharsis.

If ingested, induce vomiting, flush the material in stomach with potassium permanganate solutions.

If ingested, drink milk or egg white, gastric irrigate, call a physician.

If ingested, wash out mouth with water. Flush with water the material in stomach of victim, which has not corrosion symptoms.

If ingested, induce vomiting, flush the material in stomach with 60 ml of 1% potassium iodide.

3.3.4. Accident caused by skin contact

After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of (to be specified by manufacturer). [If irritation develops and persists, get medical attention]

If irritation develops and persists, get medical attention

Immediately wash with tincture of green soap in flowing water for 15 minutes. Flush skin with large amounts of water. [If irritation develops and persists, get medical attention].

Immediately flush skin with large amounts of water. Remove contaminated clothing. If irritation (redness, rash, blistering) develops, get medical attention.

Wash contaminated clothing before reuse.

Remove clothing and wash thoroughly before use.

Remove contaminated clothing and wash clothing before reuse Flush the contaminated area of body with large amounts of water.

Wash the contaminated area of body with soap and fresh water.

If contact with body directly, immediately obtain medical attention.

Flush with fresh water if contact with skin or eyes.

If frostbite, call a physician.

If skin contact, spread immediately with 2% silver nitrate.

3.3.5. Accident caused by contact with eyes

In case of contact with eyes rinse immediately with plenty of (to be specified by manufacturer)

Immediately flush eyes for at least 15 minutes. Get medical attention.

Flush eyes with water for at least 15 minutes. Get medical attention if eye irritation develops or persists.

Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Flush eyes with water for at least 15 minutes while holding eyelids open.

Remove contact lenses if worn. Get medical attention immediately.

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

If contact with eyes directly, flush with gently flowing fresh water thoroughly.

4. Statements for environmental protection and appropriate disposal

4.1. Environmental protection

Use appropriate containment to avoid environmental contamination.

Avoid release to the environment. Refer to special instructions/safety data sheet.

Avoid release to the environment.

Prevent release to the environment.

Use appropriate containment.

Do not let this chemical/product enter the environment.

Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark.

Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

Do not apply directly to water.

This chemical has properties and characteristics associated with chemicals detected in ground water. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

This chemical is known to leach through soil into ground water under certain conditions as a result of label use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination.

4.2. Disposal

Dispose of this container to hazardous or special waste collection point.

Dispose of this material and its container as hazardous waste.

This material and its container must be disposed of as hazardous waste.

Do not dispose of with household waste, trash or other solid waste.

Dispose of wastes in an approved waste disposal facility.

Do not empty into drains.

Do not empty into drains; dispose of this material and its container in a safe way.

Do not empty into drains; dispose of this material and its container to hazardous or special waste collection point.

This material and its container must be disposed of in a safe way.

Do not contaminate water, food, or feed by storage disposal.

Do not allow into any sewer on the ground, or into any body of water.

Refer to manufacturer/supplier for information on recovery/recycling.

The (preferred) waste management option(s) is (are) to (select the appropriate statement listed below):

- Reuse
- Recycle
- Reuse or recycle
- Send to a licensed recycler, reclaimer or incinerator
- Burn
- Burn in a municipal incinerator

Dispose of in an approved landfill

5. Special statements for consumer products

Keep locked up.

Keep out of the reach of children.

Keep locked up and out of the reach of children.

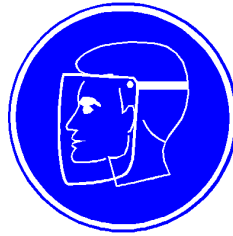
Keep away from food, drink, and animal feedstuffs

Keep out of the reach of children.

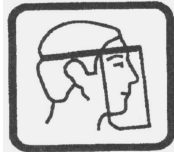
Avoid exposure during pregnancy.

PRECAUTIONARY PICTOGRAMS

From European Union (COUNCIL DIRECTIVE 92/58/EEC of 24 June 1992)



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



ANNEX 4

EXAMPLES OF ARRANGEMENTS FOR PRESENTING THE LABEL ELEMENTS ON THE LABEL.

ANNEX 5

CONSUMER PRODUCT LABELLING BASED ON THE LIKELIHOOD OF INJURY

Introduction

The scope of the work of harmonizing chemical hazard communication, (CG/HCCS) (IFCS/ISG3/98.32B, issued in 1998¹), states:

“The application of the components of the system may vary by type of product or stage of the life cycle. Once a chemical is classified, the likelihood of adverse effects may be considered in deciding what informational or other steps should be taken for a given product or use setting.”

This statement acknowledges that for certain products or use settings, once the hazard(s) of a chemical/product are identified and classified using GHS criteria, information on the likelihood of illness or injury may be used to determine if these hazard(s) need to be communicated.

Research has demonstrated²⁻⁷ that a consumer’s attention can be diverted by too much information on a label regarding all potential hazards. Furthermore, it was shown that warnings focused on specific hazards that are likely to cause injury to man or the environment enhance consumer and environmental protection. Further, the consumer exposure, from use, foreseeable use and accidents, can be estimated since products are designed for specific use(s).

The purpose of this paper is to present a general approach for conducting a likelihood of illness/injury determination. It should be noted that consumer products are the focus of this approach and the resulting label is intended for the consumer at the point of use.

Determining the Likelihood of Injury

In order to place a hazard warning on a label of a substance or product for consumer use, it must satisfy a two-part test. First, it must present one of the hazards in the GHS based on specific criteria. Second, it must have the potential to cause substantial illness or injury during or as a result of "reasonably foreseeable handling or use or ingestion by children". In other words, whether a given substance presents a hazard depends not only on whether it is toxic, but also on exposure and risk. The following steps in this process are consistent with the US CPSC Guidelines⁸, the European Commission Directive 93/67/EEC⁹, the European Commission Technical Guidance Document¹⁰ and Expert Reports^{11, 12, 13} for assessment of exposure to chemicals.

Briefly, once a substance or a product is classified based on the GHS classification criteria, one needs to determine the potential exposure from the use of the product. The extent of the exposure assessment would depend on the hazard. For example in the case of skin/eye corrosion or irritation, since a drop or two may cause the harm, a labeling for the hazard would be required, unless the corrosive or irritating substance was sealed in such a manner that exposure was not possible. Similarly, for other acute hazards one would label the product unless the product was in a form or quantity that there would be insufficient exposure to produce the adverse effect.

For non-cancer chronic endpoints, an “acceptable daily intake” (ADI) would be calculated from the “no observed adverse effect level” (NOAEL). An uncertainty factor approach can be used. Generally acceptable uncertainty factors include a factor of ten to account for differences in sensitivity between individuals, and another factor of 10 for differences between animals and humans. In cases where a NOAEL has not been established, the ADI is calculated from the lowest observed (adverse) effect level (LOEL) using an additional 10-fold uncertainty factor. For a conservative estimate of exposure, one can assume that the consumer will use the entire consumer product in a day and/or assume that all of the hazardous substance/mixture that the consumer is exposed to will be absorbed. If the resulting exposure is lower than the “acceptable daily intake” no hazard communication would be required.

If the exposure level is higher than the ADI then either a more refined quantitative assessment could be performed before making a final labeling decision or, if refined data are not available or a refined analysis is not opted for, the hazard would be communicated on the label.

For carcinogens, a unit risk from exposure to the carcinogen would be calculated based on linear extrapolation with the multistage model as a default model. The maximum likelihood estimate of risk, or MLE risk, rather than the upper bound, should be used, except when the MLE risk is not a linear function of dose. If there is convincing evidence that an alternative model to the multistage model would be more appropriate then another model can be used. Life time exposures can be calculated either by assuming worst case scenarios such as all of the substance in a product is reaching the target tissue at each use, exposure is daily/weekly/monthly or by determining actual exposures during use or combinations thereof. Based on prevailing practice, a substance/product is labeled for cancer hazard if the lifetime excess risk exceeds one-in-a-million from exposure during "reasonably foreseeable handling and use."

References

1. ILO. 1999. "Current Sector Uses of Risk Communication," IOMC/ILO/HC3/99.7.
2. A. Venema, M. Trommelen, and S. Akerboom. 1997. "Effectiveness of labelling of household chemicals," Consumer Safety Institute, Amsterdam.
3. Leen Petre. 1994. "Safety information on dangerous products: consumer assessment," COFACE, Brussels, Belgium.
4. European Commission. 1999. DGIII Study on Comprehensibility of labels based on Directive 88/379/EEC on Dangerous Preparations.
5. Magat, W.A., W.K. Viscusi, and J. Huber, 1988. "Consumer processing of hazard warning information," *Journal of Risk and Uncertainty*, 1, 201-232.
6. Abt Associates, Inc. 1999. "Consumer Labelling Initiative: Phase II Report," Cambridge, Massachusetts, Prepared for US EPA.
7. Viscusi, W.K. 1991. "Toward a proper role for hazard warnings in products liability cases," *Journal of Products Liability*, 13, 139-163.
8. US Consumer Product Safety Commission. 2001. Code of Federal Regulations, Subchapter C – Federal Hazardous Substances Act Regulations, 16, Part 1500 .
9. European Commission. 1993. Commission Directive 93/67/EEC of 20th July 1993 laying down the principles for assessment of risks to man and to the environment of substances notified in accordance with Council Directive 67/548/EEC.
10. European Commission. 1996. Technical Guidance document in support of commission directive 93/67/EEC on risk assessment for new notified substances and commission regulation (EC) NO 1488/94 on risk assessment for existing substances. Part 1. Brussels, Belgium.
11. ECETOC. 1994. Assessment of Non-Occupational Exposure to Chemicals. Technical Report No. 58. European Centre for Ecotoxicology and Toxicology of Chemicals, Brussels, Belgium.

12. ECETOC. 1997. Exposure Assessment in the Context of the EU Technical Guidance Documents on Risk Assessment of Substances. Technical Report No. 35. European Centre for Ecotoxicology and Toxicology of Chemicals, Brussels, Belgium.
13. Saouter, E., G. Van Hoof, C. Pittinger, and T. Feijtel. 2000. "A retrospective analysis of the environmental profile of laundry detergents," submitted to: International Journal of life cycle analysis, October 2000.

ANNEX 6

COMPREHENSIBILITY TESTING METHODOLOGY