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International chemical safety cards and global harmonization

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Abstract

The International Chemical Safety Cards (ICSCs) project began in 1986 and is an undertaking of the International Programme on Chemical Safety (UNEP, ILO and WHO). It is being developed in co-operation with the Commission of the European Communities. ICSCs are comprehensive, concise, and simple summaries of essential health and safety information on specific chemicals for use as basic information and training tools at the “shop floor” level by workers and employers. Although of international origin, they are not legally binding. The cards consist of a series of standard phrases on information collected, verified, and peer reviewed by internationally recognized experts, and taking into account advice from manufacturers and Poison Control Centers. Since the cards might be the principal information source in less developed areas or in small and medium size enterprises, their usefulness is increased by their availability in multiple languages. The cards make reference to existing classifications numbers and there is great similarity when compared with categories used in MSDSs; however, the information on the cards is abbreviated, standardized, and targeted for less technical readers. The cards are therefore considered complementary to the more detailed MSDSs. Approximately 60% of the goal of 2000 cards are now completed, including the periodic updates of existing cards. The ICSC serves as a model for disseminating chemical safety information to workers and is available in multiple languages on the Internet. The cards are part of the effort to achieve a globally harmonized system for the classification and labeling of chemicals. © 2001 Published by Elsevier Science Ltd. All rights reserved.

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1. Introduction

The International Chemical Safety Cards (ICSC) project is an undertaking of the International Programme on Chemical Safety (IPCS). This overview describes the process of card production and the project's overall relationship to global harmonization.

The project, which began in 1986, is carried out in the context of co-operation between the IPCS and the European Union (EU), and is a contribution to the implementation of the recommendations made by the 1992 United Nations' Conference on Environment and Development (UNCED) Agenda 21, Chapter 19 on environmentally sound management of toxic chemicals (UNCED, 1992). In this context, the ICSC project relates directly to two program areas for action identified in Chapter 19, namely (1) Harmonization of classification and labeling of chemicals, and (2) Information exchange on toxic chemicals and chemical risks (ILO, 2000). Funding of this long-term activity is provided by the World Health Organization (WHO), the EU and the International Labour Organization (ILO). The project is managed by the ILO on behalf of IPCS.

Experts from national institutions under various ministries (Health, Labor, Environment) produce ICSCs and peer-review approximately 100 cards at each of the meetings held twice a year and financed by the institutions on a rotational basis. Manufacturers of chemicals and representatives of employees and workers' associations are invited as observers to the peer-review meetings. The ICSCs are prepared using a computerized system and a library of standard phrases (ILO, 2000; NIOSH/ICSC) which once translated to a given language, provide for nearly automatic translation of the cards. Dissemination of the ICSCs is done worldwide through the Internet, CD-ROM, and paper publications.

2. Purpose

The ICSCs summarize essential health and safety information on chemical substances in a clear and concise way and are intended for use at the shop-floor level by workers, and by those who are responsible for safety and health in factories, agriculture, construction, and in any other workplace, as well as by emergency responders. They are also designed for use by employers when undertaking the duty of providing information and instruction to workers. ICSCs are not legally binding documents, but consist of a series of standard phrases, mainly summarizing health and safety information collected, verified, and peer reviewed by internationally recognized experts, taking into account advice from manufacturers and Poison Control Centers. The ICSCs have a special role to play as a potential principal information and training source in less developed countries and in small and medium size enterprises, for both management and workers.

To a large extent, the information provided in the ICSCs conforms to the 1990 ILO Convention No. 170 (ILO, 1990a) and Recommendation No. 174 (ILO, 1993) on safety in the use of chemicals at work, and to the EU Directive 91/155/EEC

(1991) as amended by the Directive 93/112/EC (1993). It must be emphasized that the ICSCs have no legal status and should be seen as an international reference with respect to chemical safety information. In addition, the ICSC may not reflect, in all cases, all the detailed requirements included in national legislation on the subject. The addition of national regulatory measures/standards can be made to the ICSCs since the format contains free space to accommodate such information as well as other national viewpoints, if required. The user should therefore verify compliance of cards with the relevant detailed requirements in the country of use.

3. Preparation

The ICSCs are prepared through an ongoing process (Fig. 1) of several steps involving drafting, editing, consultation, and peer-reviewing by scientists from Participating Institutions (PIs) designated by the Member States, who contribute to the work of the IPCS. This process considers the advice and comments provided by manufacturers, workers' and employers' organizations, as well as Poison Control Centers and other national, regional, and international institutions specialized in chemical safety, toxicology, and medicine. Overall, new or updated ICSCs are circulated for comments to more than 250 contact points throughout the world.

The importance of a peer review step is paramount since this represents a significant asset of the ICSCs versus other packages of information prepared at national, local or

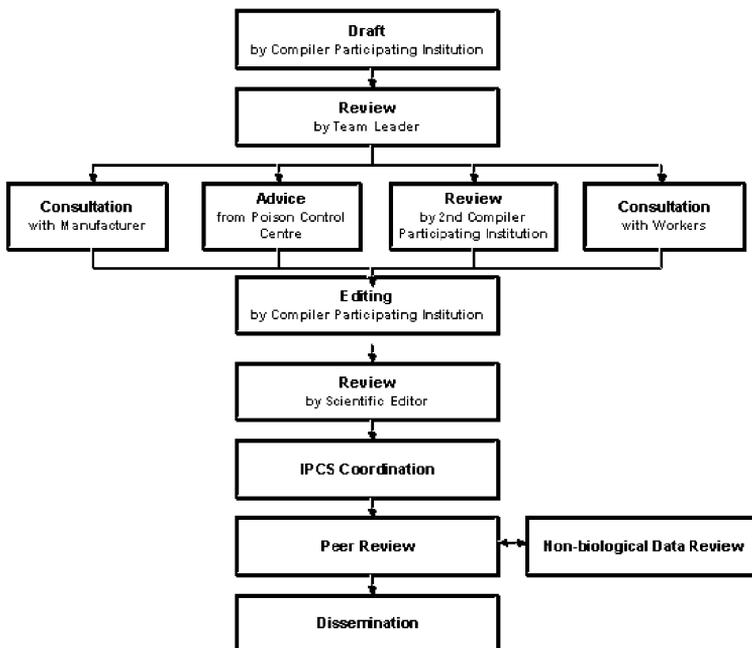


Fig. 1. ICSC Process Flowchart.

professional levels. The preparation and translation process is based on a specialized computer program which includes a library of Standard Phrases, data entry modules, an online guide for the selection and use context for each of the standard phrases, as well as a module for automatic translation of the ICSC from English to any language for which Standard Phrases in that language are available in the system.

The national institutions who participate in the preparation of the original reference ICSCs in English have been selected by the IPCS with endorsement of the IPCS Programme Advisory Committee which includes ILO employers' and workers' representatives named by the ILO Governing Body. The IPCS has formal memoranda of understanding with all of these institutions. In addition, a continuous information exchange process is maintained between the production and translation institutions. These currently participating institutions include:

- British Industrial Biological Research Association (BIBRA), Carshalton, Surrey, UK.
- Commission de la Santé et de la Sécurité du Travail (CSST), Montreal, Quebec, Canada.
- Fraunhofer Institute, Hanover, Germany.
- Institute for Public Health-Louis Pasteur (IPH), Brussels, Belgium.
- Instituto Nacional de Seguridad e Higiene en el Trabajo (INSHT), Barcelona, Spain.
- Hungarian Institute of Occupational Health, Budapest, Hungary.
- National Chemical Emergency Centre, Abingdon, Oxfordshire, UK.
- National Institute for Occupational Safety and Health (NIOSH), Cincinnati, OH, USA.
- National Institute of Health Sciences (NIHS), Tokyo, Japan.
- Nederlands Instituut voor Arbeidsomstandigheden (NIA), Amsterdam, The Netherlands.
- Nofer Institute of Occupational Medicine, Lodz, Poland.
- Safety, Health, Environment International (SHEI), Winterburn, Alberta, Canada.
- Työterveyslaitos/Institute of Occupational Health (IOH), Helsinki, Finland.

4. Characteristics of the ICSC

The ICSC is comprehensive. The information that a card contains is related to a specific chemical substance and to the intrinsic hazards posed by that chemical. Downstream risks will vary according to how a substance is used. A card cannot, in practical terms, address all problems that might occur in the multitude of possible work situations, nor can it provide all the fine details needed when working with a particular substance. However, the cards do offer a basic tool to supply the workers with information on the properties of the chemicals being used.

The identification of the chemicals on the cards is based on the UN numbers, the Chemical Abstracts Service (CAS) numbers and the Registry of Toxic Effects of

Chemical Substances (RTECS/NIOSH) numbers. It is thought that the use of these three systems assures the most unambiguous method of identifying the chemical substances concerned, referring as it does to numbering systems that consider transportation matters, chemistry and occupational health. The ICSCs project makes reference to existing classifications of chemicals and is not intended to generate any new classification. As an example, the cards cite the UN hazard classification and packaging group, as well as the Risk and Safety Phrases, when they exist. Moreover, the ICSCs are designed with reserved space for countries to enter information of national relevance, such as occupational exposure limits.

Great similarities exist in content when comparisons are made between the various headings of the ICSCs and the manufacturers' MSDS as demonstrated in Table 1.

However, MSDSs and ICSCs are not the same. The MSDSs, in many instances, may be technically very complex and too extensive for shop-floor use, and secondly it is a management document. The ICSCs, on the other hand, set out peer-reviewed information about substances in a more concise and simple manner. While not a legal document, the ICSC is an international authoritative document emanating

Table 1
Comparison of ICSCs and MSDSs by Information Category^a

International Council of Chemical Associations (ICCA) Headings of MSDSs	International Programme on Chemical Safety (IPCS) Headings of ICSCs
1. Chemical product and company identification	1. Chemical identification
2. Composition/Information on ingredients	2. Composition/formula
3. Hazards identification	3. Hazard identification from fire and explosion, and from exposure by inhalation, skin, eyes and ingestion, and prevention measures (with personal protective equipment)
4. First-aid measures	First-aid measures
5. Firefighting measures	Firefighting measures
6. Accidental release measures	4. Spillage, disposal
7. Handling and storage	5. Storage
8. Exposure controls/Personal Measures	6. Packaging, labeling and transport
See 15. below	See 3. above
9. Physical and chemical properties	7. Important data: Occupational exposure limits
10. Stability and reactivity	See 8. below
11. Toxicological information	Physical and chemical dangers Routes of exposure Effects of short- and long-term exposure
See 9. above	8. Physical properties
12. Ecological information	9. Environmental data
13. Disposal considerations	See 4. above
14. Transport information	See 6. above
15. Regulatory information	See 7. above
16. Other information	10. Note
	11. Additional information

^a Adapted from ILO³

from WHO/ILO/United Nations Environmental Program (UNEP). This is not to say that an ICSC should be a substitute for an MSDS, since it cannot replace management's responsibility to communicate with workers on the exact chemicals and the nature of those chemicals used on the shop floor, as well as the risk posed in any given workplace. The ICSC and the MSDS can be thought of as complementary instruments, and the ICSC can serve as a model for disseminating chemical safety information to workers, regardless of language.

5. Availability and dissemination

Printed versions of the ICSCs are available from the European Commission and the translated versions are being made available through national authorities, i.e. Ministries of Labor, Ministries of Health, and Health and Safety National Authorities. Some sets are available on CD-ROM. NIOSH originally hosted the availability of the ICSCs on the World Wide Web. All existing 1250 ICSCs in English and other languages are freely available or linked on the NIOSH/ICSC web site (ILO, 2000; NIOSH/ICSC). The ICSCs are currently being electronically translated into 27 languages and dialects. Partial collections exist and financial assistance was provided by ILO during the 1998–1999 biennium to translate and publish the ICSCs in Portuguese (Brazil) and in Hindi, Bangla and Tamil (India). The participation of the ILO in this project ensures that reliable information on the hazards of toxic chemicals and effective protection measures are provided to workers, and to those responsible for their safety and health, in their language and in a format which is practical and easy to understand. Needs and requirements of developing countries and countries in transition are discussed during biennial workshops on the translation of ICSCs. A list of the institutions currently co-operating in producing and translating ICSCs is provided in Table 2.

6. Relationship of ICSCs to global harmonization

The involvement of international organizations in the field of classification and labeling of chemicals started in the early 1950s (ILO, 2000). In 1952, the ILO called on its Chemical Industries Committee to study the classification and labeling of dangerous substances. In 1953, the United Nations (UN) Economic and Social Council created within the Economic Council for Europe, the UN Committee of Experts on the Transport of Dangerous Goods. This Committee elaborated the first internationally recognized classification and labeling system for the purpose of transporting dangerous goods. The UN Recommendations on the Transport of Dangerous Goods (RTDG) was first published in 1956. Other UN organizations such as the International Maritime Organization, the International Civil Aviation Organization, as well as other international and regional bodies covering all transport modes, use the RTDG as a basis for classification and labeling of chemicals for the purpose of transport. The RTDG are now included in the transport legislation

Table 2
Availability of multiple language versions of the ICSCs

Language	ICSCs translated	Participating institution
Arabic ^a	~100	Syrian Poison Information Center, Damascus, Syria
Chinese ^b	All ^c	Environ. Protection Res. Inst., Beijing, China
Czech	225	National Institute of Public Health, Prague, Czech Republic
Danish	78	First set published by EC
Dutch	78	First set published by EC
English ^b	All	Reference language for production and translation
Finnish ^b	All	Finnish Institute of Occupational Health, Helsinki, Finland
French ^b	All	Belgian Scientific Institute of Public Health, Brussels, Belgium
German ^b	All	BGVV, Dortmund, Germany
Greek	78	First set published by EC
Indian	None	Central Labour Institute in Bombay, India. (Hindi, Bangla, Tamil)
Indonesian ^c	~353	Hazardous Substances Information Centre Jakarta, Indonesia
Italian	78	First set published by EC
Japanese ^b	All	Nat = 1 Inst. Health Sciences, Tokyo, Japan
Korean ^{b,d}	~350	Nat = 1 Inst. Environ. Res., Seoul, Korea
Malaysian	~380	Department of Occupational Safety and Health, Kuala Lumpur, Malaysia
Polish	~400	Nofer Institute of Occupational Medicine, Lodz, Poland
Portugese	78	First set published by EC Poison Control Centre in São Paulo, Brazil
Russian ^b	~200	University of St. Petersburg, Moscow, Russian Federation
Sinhalese	None	Further work contingent upon resources
Spanish ^b	All	Instituto Nacional de Seguridad e Higiene en el Trabajo, Barcelona, Spain
Swahili ^b	All	IPCS Secretariat, Geneva, Switzerland
Thai	All	Ministry of Public Health, FDA, Bangkok, Thailand
Urdu ^{a,d}	None	Further work contingent upon resources
Vietnamese ^a	60	National Institute of Labour Protection, Hanoi, Vietnam

^a ILO project planned for 2000.

^b Web availability.

^c All refers to all cards currently published which is approximately 1200 cards.

^d Standard phrases not yet translated.

of most of the UN member States and are also used for labeling chemicals in the workplace in a large number of developing countries (UN, 1995).

In 1989, the ILO adopted a resolution concerning the harmonization of systems of classification and labeling for the use of hazardous chemicals at work, and in 1990, a Convention (No. 170, 1990a) and a Recommendation (No. 177, 1990b) were adopted concerning safety in the use of chemicals at work. In response to the Resolution, the ILO evaluated the size of the task of harmonizing classification systems.

In November 1991, the Joint Meeting of the Chemicals Group and Management Committee of the Organisation for Economic Co-operation and Development (OECD) endorsed the participation of the OECD in international ongoing and future harmonization activities, particularly those initiated within the IPCS. A clearinghouse led by the CEC, Sweden, and the USA was established to undertake harmonization of classification criteria for acute oral toxicity and hazard to the environment (OECD, 2000b). A Co-ordinating Group for the Harmonization of Chemical Classification Systems was established between the ILO, the WHO,

UNEP, the Secretariat of the United Nations (UN) Committee of Experts on Transport of Dangerous Goods and the OECD in 1992.

In 1992, The UN Conference on Environment and Development in Rio de Janeiro, Brazil, identified harmonization of classification and labeling of chemicals by the year 2000 as being one of the six action programs, and recommended that IPCS should be the nucleus for international co-operation on environmentally sound management of toxic chemicals. In March 1995, six intergovernmental organizations (WHO, ILO, UNEP, FAO, UNIDO and OECD) agreed to a Memorandum of Understanding establishing an Inter-Organization Programme for the Sound Management of Chemicals [IOMC consisting of FAO, ILO, OECD, UNEP, UNIDO, UNITAR, and WHO OECD, 2000a] which co-ordinates the chemical safety activities of the partners through an Inter-Organization Co-ordinating Committee (IOCC). The existing IPCS remains as a joint technical program of WHO, ILO and UNEP within the framework of the IOMC. The IPCS is the focal point for the Hazard Communication and the tasks which center on the production of the ICSCs, including:

1. Labeling: minimum data element requirements; graphic hazard symbols (pictograms, colors, frames); comprehensibility of written and graphic hazard warnings; method for the selection of proper hazard symbols and risk and safety phrases.
2. Chemical safety data sheets: format; data elements; harmonization of phraseology; phraseology comprehensibility; means of dissemination on a world-wide basis.
3. Training in hazard communication (workplace, transport, consumers): harmonization of principles for the elaboration and training packages for compilers and users.

7. Conclusions

The International Chemical Safety Cards provide essential, summarized, and peer-reviewed health and safety information on chemical substances in a clear, standardized, and concise format. The cards provide supplemental information which augments training and labeling in the hazard communication process. They are intended for use at the shop-floor level by workers, by emergency responders in the field, and by those who are responsible for safety and health in factories, agriculture, construction, and in many other workplaces. Their utility is enhanced by their availability in multiple languages to ensure uniformity of the information conveyed in multiple-language work places, as well as in trans-global use of chemicals, especially in developing countries.

A recent focus group held entirely with emergency responder participants found that the ICSCs provided the majority of reliable information needed in the field which included the hazards of toxic chemicals and effective protection measures in a format which is practical, enabled quick access, and is easy to understand. This

activity gave additional support from a group of users to the usefulness and universal applicability of these cards in work places other than factories.

The web site statistics recently analyzed for the year 2000 showed more than 85,000 hits per month which include English, French and German; however, the number of hits for the other languages are not known at this time. The 10 most frequently searched chemicals included sodium lauryl sulfate, trisodium phosphate, sodium hypochlorite, ammonium hydroxide, diethyl ether, cyclohexene, potassium chlorate, citric acid, benzoic acid, and boric acid. Therefore, it is essential that this project continues to provide the much needed globally harmonized information by completing the list of important and diverse chemicals, appropriately updating the information and providing the information to the global audience through Web-based information technology.

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