

# REGULATORY INFORMATION ON HAZARDOUS CHEMICALS IN A GLOBAL PERSPECTIVE

By

**K. Harald Drager, Ann Kristin Larsen, Kenneth Fjeld, Jan Olav Ryan and Erik Ulven**  
A/S QUASAR Consultants  
Harbitzalleen 12  
0275 Oslo  
Norway  
[harald@quasar.no](mailto:harald@quasar.no)

## ABSTRACT

International and national regulations govern requirements of how producers and users of hazardous chemicals shall inform others about the risk and safety aspects of handling these chemicals. The main pieces of information required are the MSDS (Material Safety Data Sheet), Trem Card (Transport Emergency Cards), and hazard labels. This paper describes the content of this information and the regulatory aspects in different countries, and make some observations on how to arrive at global harmonisation of chemical regulations.

The chemical information also must be made available to those working with chemicals, and in this world with some hundred languages, it is a great challenge to distribute this information, according to both local and national regulations, in a form that is understandable to anyone handling hazardous chemicals. However, computer programs and the Internet have made this an achievable task. This paper describes the necessary software structure to meet this challenge, and how the process of assembling this information can be highly automated.

The system providers of such software throughout the world are handling their tasks differently regarding database structures and data formats. From a global perspective, the need for an exchangeable format is obvious in order to allow a free float of this regulatory information from producers to the different users in order to improve the safety aspects of handling hazardous chemicals. This paper describes a proposed exchangeable format that will allow such free float of this information, and thus contribute to a higher global safety level in handling hazardous chemicals.

A few examples of regulatory requirements, software solutions, and exchangeable formats are demonstrated in the paper.

## 1. INTRODUCTION

International and national regulations govern the requirements on how producers and users of hazardous chemicals shall inform others about the risk and safety aspects of handling their chemicals. The purpose is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. Evaluating the potential hazards of chemicals and communicating information concerning hazards and appropriate protective measures to employees may include provisions for developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present. Labelling of containers of chemicals in the workplace as well as of containers of chemicals being shipped to other workplaces is of great importance. Preparation and distribution of material safety data sheets to employees is also one of the requirements, as well as development and implementation of employee training programs regarding hazards of chemicals and protective measures.

## 2. THE REGULATORY REQUIREMENTS

The main pieces of information needed are Material Safety Data Sheets (MSDSs), Hazard Labels, and Transport Emergency Cards (TremCards).

## 2.1 The Material Safety Data Sheet

Chemical manufacturers and importers shall obtain or develop a MSDS for each hazardous chemical they produce or import. There are different requirements for the information in the MSDS, depending on the national legislation, but generally the MSDS shall contain at least the following information:

- The identity of the product (the same as used on the label).
- If the hazardous chemical is a single substance, its chemical and common name. If the hazardous chemical is a mixture, the chemical and common name of the ingredients that contribute to the known hazards, and the common name of the mixture itself.
- Physical and chemical characteristics of the hazardous chemical.
- The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity.
- The health hazards of the hazardous chemical, including signs and symptoms of exposure and any medical conditions that are generally recognised as being aggravated by exposure to the chemical.
- Exposure limits.
- Any generally applicable precautions for safe handling and use, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks.
- Emergency and first aid procedures.
- The date of preparation of the MSDS or the last change to it.
- The name, address and telephone number of the chemical manufacturer, importer, employer, or other responsible party preparing or distributing the MSDS, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

Fig. 1: Example of a Material Safety Data Sheet

Acrobat Exchange [Acetic acid PDF]

File Edit Document View Tools Window Help

SAFETY DATA SHEET  
ACETIC ACID

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY:

PRODUCT NAME: 10% a.c. 20

INDUSTRIAL TRADE NAME: 10% a.c. 20/20

SUPPLIER: 10% a.c. 20/20

TELEPHONE: 10% a.c. 20/20

FAX: 10% a.c. 20/20

2. COMPOSITION/CONCENTRATION OF INGREDIENTS:

10% a.c. 20/20

3. HAZARDOUS IDENTIFICATION:

From water 10% a.c. 20/20

4. FIRST AID MEASURES:

GENERAL: 10% a.c. 20/20

5. FIRE FIGHTING MEASURES:

6. ENVIRONMENTAL INFORMATION:

10% a.c. 20/20

PAGE 1 OF 5 76% 0.53 x 1.82 in



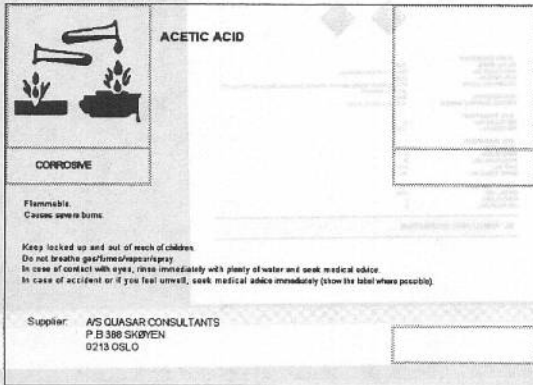


## 2.1 The Hazard Label

The employer shall ensure that each container of hazardous chemicals in the workplace is labelled, tagged, or marked with the following information:

- Identity of the hazardous chemical(s) contained therein.
- Appropriate hazard warnings that will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

Fig. 2: Example of a Hazard Label

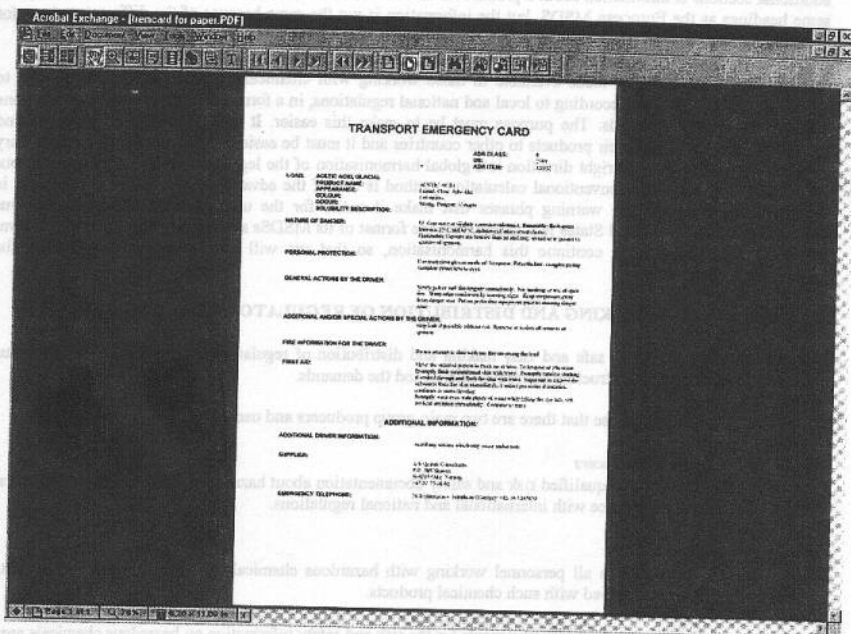


## 2.3 The TremCard

When transporting a hazardous chemical by road, railway, sea, or air, the chemical must be evaluated according to transport classification. Today we have international legislation, IMDG and IATA, that regulates transport of dangerous goods by sea and air.

TremCards are necessary when transporting dangerous goods. This documentation describes the hazards of the goods and gives the driver information regarding emergency procedures and personal protective equipment. The TremCard must be written in the national language where the dangerous goods are being transported.

Fig.3: Example of a TremCard



## 2. THE REGULATORY ASPECTS IN DIFFERENT COUNTRIES

Generally the above mentioned are common purposes. However the different countries have their own regulations. There are numerous inventory lists of existing chemical substances, lists of national exposure values, lists of carcinogenic substances etc. In Europe the members of the European Community (EC) have adopted the EC Council Directives, strictly regulate handling of hazardous chemicals. Members of the EC may have some derogations from the EC rules. One example is Denmark, which has a special classification system for organic solvents (Kodenummer). Another is Germany that have a special water classification system. Norwegian legislation is to be harmonised with EU legislation, in accordance with the EEA Agreement, but until further notice Norwegian rules will continue to have 4 derogations: classification of carcinogenic substances and preparations, classification of sensitising preparations, OAR (occupational air requirement) labelling and classification and labelling of certain substances with respect to health hazards.

The EC Council Directives describes a conventional calculation method using concentration limits for classification and labelling of preparations. In the United States the mixture shall be assumed to present the same health hazard as do the components which comprise one percent (by weight or volume) or greater of the mixture, except that the mixture shall be assumed to present a carcinogenic hazard if it contains a component in concentrations of 0.1 percent or greater. The main difference between these two systems is that the European system has special danger symbols and warning phrases to be used in labelling dangerous chemicals. There are 10 symbols, 5 that indicates health danger, 4 that indicate danger with respect to physico-chemical properties and 1 that indicates environmental hazard. The symbols are printed in black on an orange-yellow background on the label. The warning phrases consist of risk phrases and safety advice phrases.

The Material Safety Data Sheet are made up of 16 sections and also contain the danger symbols and the warning phrases. In the United States, OSHA regulations state the required information, but have no demand for a special format. There are different standards for MSDS's. Two of them are ISO (International Organization for Standardization) and ANSI (American National Standards Institute). An MSDS will usually be made up of at least 10 sections if there is compliance with the voluntary ANSI standard Z400.1. There may be up to 6

additional sections if information about a product for these sections is available. The 16 sections have mainly the same headings as the European MSDS, but the information is not the same because of the different systems for classification.

The chemical information is made available to those working with chemicals. It is a challenge to be able to distribute this information, according to local and national regulations, in a form that is understandable to anyone handling hazardous chemicals. The purpose must be to make this easier. It must be easier for suppliers and manufacturers who export their products to other countries and it must be easier for the user to get the necessary information. One step in the right direction is a global harmonisation of the legislation. Many advantages favour the European system. The conventional calculation method is one of the advantages, but the most important is the danger symbols and the warning phrases that make it easier for the user to identify the hazards. Our observation is that the United States is standardising the format of its MSDSs according to the European system. Hopefully, it is possible to continue this harmonisation, so that we will have only one set of rules for classification worldwide.

### 3. SAFE AND EASY MAKING AND DISTRIBUTION OF REGULATORY INFORMATION

In order to meet the goal of safe and easy making and distribution of regulatory information about hazardous chemicals, it is important to structure the requirements and the demands.

It is then important to recognise that there are two main group producers and users:

- *Chemical Producers*
  - Must issue qualified risk and safety documentation about hazardous chemicals to all end users, in accordance with international and national regulations.
- *End users*
  - Must inform all personnel working with hazardous chemicals of the risk, health, and safety issues involved with such chemical products.

According to the legislation, further requirements for the risk and safety information on hazardous chemicals are:

- The risk and safety documentation has to be presented in the local language and in accordance with national regulations.
- The risk and safety documentation must be regularly and constantly updated following any changes of the regulations.

The above demands and requirements lead to the following product requirements.

#### The Producer

- Needs a system for automatic production of multilingual risk and safety documentation for hazardous chemicals in compliance with national regulations.
- Must be able to distribute this information to customers and keep such information fully updated in accordance with valid regulations at any time anywhere.

#### The End user

- Needs a computerised solution to retrieve, update, and generate risk and safety documentation about hazardous chemicals in any local language from producers.
- Distribute such information throughout the organisation, and be able to do specific information searches and receive automatic updates in compliance with valid national regulations.

#### Internet

The answer to meeting the above requirements is the Internet.

- The Internet provides a global gateway between producers and the end users of hazardous chemicals.

- Using the Internet, easy and direct distribution of regulatory risk and safety documentation in relevant languages is achieved, thus keeping fully up to date databases in accordance with any legislative amendments.
- Internet saves the producers from costly distribution and management costs.
- For the end user, Internet reduces, or will often eliminate, the need for a stand-alone in-house information system on hazardous chemicals.

In the following, examples from an Internet software solution to meet above requirements are demonstrated.

#### 4. EXAMPLE OF INTERNET SOLUTIONS

The producers need to give their customers access to the risk and safety information in an orderly manner. Fig 4 shows a solution for a customer where the most important risk and safety information on the chemicals is listed.

When the user hits the name of the chemical, a list of the languages the MSDS will appear in is shown, giving the user a choice of languages for the MSDS.

Fig. 4: The Producers list of chemicals

Item no.	Name	CAS no.	EPD no.	UN no.	Revision Date	Product code	Supplier	Label of supply	Risk
11000	BIRAL T AND D				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11008	BIRAL T AND D (FLUID)					1908-11-08	Biral Lubrificanti A/S	A	2
11005	BIRAL VG - VISCO GREASE				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11008	BIRAL VG HT - VISCO GREASE HIGH TEMPERATURE				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11007	BIRAL SO - SILICON GREASE				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11008	BIRAL EC - SURFACE CLEANER				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11009	BIRAL PD - PENETRATING OIL				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11010	BIRAL PD (FLUID)					1908-11-08	Biral Lubrificanti A/S	A	2
11011	BIRAL ODW (FLUID)					1908-11-08	Biral Lubrificanti A/S	A	2
11012	BIRAL ODW - OPER GEAR AND WISE				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11012	BIRAL B 1					1908-11-08	Biral Lubrificanti A/S	A	2
11011	BIRAL B 2					1908-11-08	Biral Lubrificanti A/S	A	2
11018	BIRAL VG (FLUID)					1908-11-08	Biral Lubrificanti A/S	A	2
11018	BIRAL SO - SILICON OIL				1999	1908-11-08	Biral Lubrificanti A/S	A	2
11000	BIRAL MPO - MULTI PURPOSE GREASE					1908-11-08	Biral Lubrificanti A/S	A	2



Fig. 5: Easy access to the MSDS in different languages

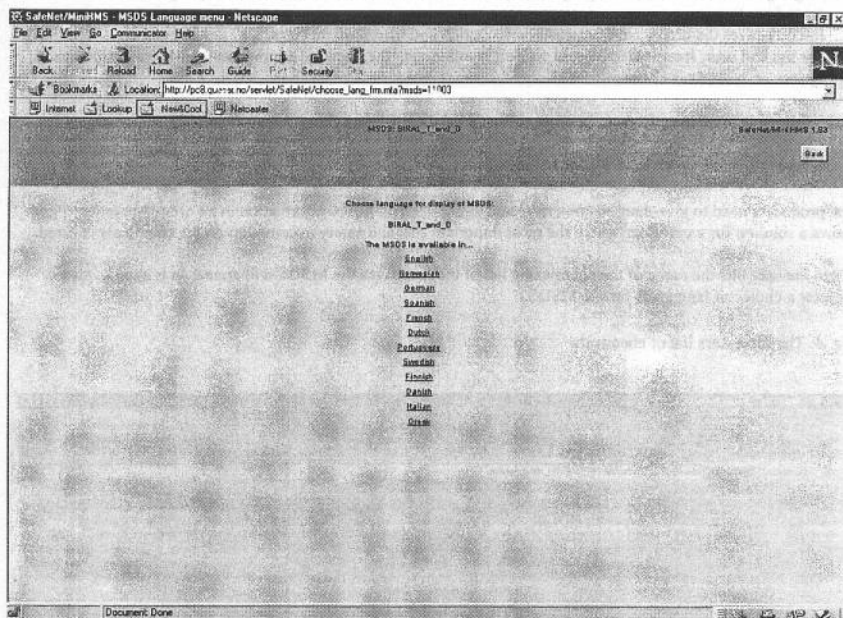


Fig. 6: Result of a search for an Extremely Flammable Chemical

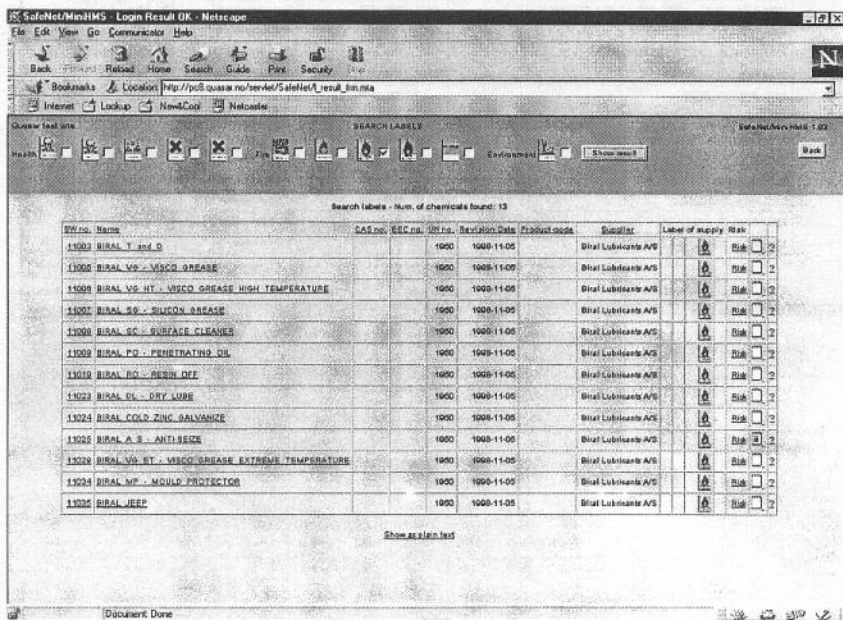


Fig. 6 shows the result of a search for extremely flammable products performed by the user.

Fig. 7: The list of chemicals for a work place in the organisation

The screenshot shows a web browser window with a navigation menu on the left and a main content area on the right. The navigation menu lists various workplace locations: TEST SITE, ENVIRONMENTAL DEPARTMENT, STORAGE 1, GREEN BAY, DOCK 1, SUPERDOCK, DOCK 2, DOCK 3, DOCK 4, DOCK 4.1, and STORAGE 4. The main content area is titled 'DOCK 4.1' and displays the following information:

DOCK 4.1  
 Total amount of substances in DOCK 4.1 and all its sub-organisations  
 Papers in storage: None  
 Number: 12  
 Address:  
 Mail box:

Number of chemicals found: 5

SWID.	NAME	CAS.N.	SUBST.	Level of supply	Risk	Total quantity	Unit
11020	BIRAL_BIO_30		Biol Lubricants A/B		Clas	0.0	<input type="checkbox"/>
11012	BIRAL_B1		Biol Lubricants A/B		Clas	0.0	<input type="checkbox"/>
11024	BIRAL_COOL_ZINC_BALANCE		Biol Lubricants A/B	A	Risk	0.0	<input type="checkbox"/>
11025	BIRAL_T and P (FLUID)		Biol Lubricants A/B		Clas	0.0	<input type="checkbox"/>
11026	BIRAL_VO_VISCO_DEGRAD		Biol Lubricants A/B	A	Clas	0.0	<input type="checkbox"/>

Fig. 7 shows how the different chemicals can be linked to the workplace where they are in use. This gives an excellent overview and easy access for the users at that workplace, for the risk and safety information on hazardous chemicals when needed.

## 5. A STANDARD FORMAT

The above Internet solution is performed by using PDF or HTML format on the risk and safety information. The information is produced by the SAFE ENTERPRISE SYSTEM, an in-house automatic and multilingual software system for the producers.

Because the MSDS system suppliers use different internal database formats, it is necessary with an exchangeable format for the Internet risk and safety information on hazardous chemicals.

The XML (extended HTML) format seems to be a possible global exchange format for the risk and safety information on hazardous chemicals, where the different information to be searched can be tagged. This makes possible a free float of risk and safety information on the Internet from the different producers to all end users.

## 6. CONCLUSIONS

The Internet has made it possible for a free float of multilingual risk and safety information on hazardous chemicals.

A global harmonisation and an agreed exchangeable format of the information will contribute to a higher global safety level in handling hazardous chemicals.

## REFERENCES

Occupational Safety and Health Administrations.

OSHA Regulations (Standards - 29 CFR). Hazard Communication. - 1910.1200.

Council Directive 67/548/EEC.

Norwegian Pollution Control Authority, Directory of Labour Inspection, Directorate for Fire and Explosion Prevention, Norwegian Petroleum Directorate, Product register.  
Regulations relating to the classification, labelling etc. of dangerous chemicals.  
1998, Norway.

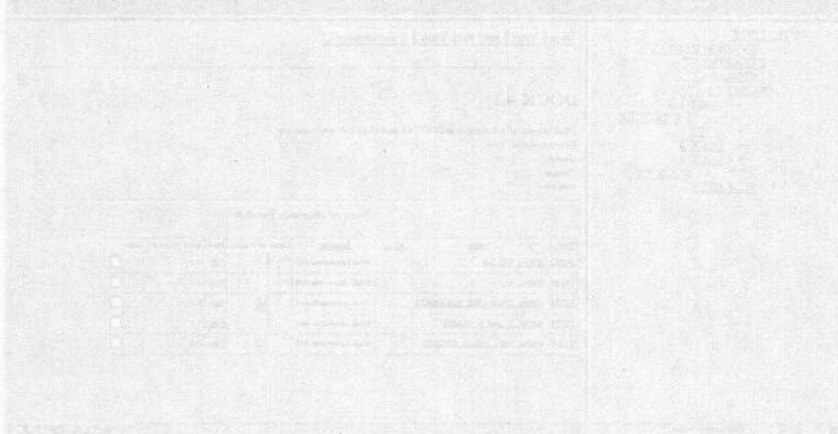


Fig. 7 shows how the different chemicals can be linked to the workplace where they are in use. This gives an excellent overview and easy access for the users at that workplace for the risk and safety information on hazardous chemicals when needed.

## 2. A STANDARD FORMAT

The above database solution is prepared by using PHP or HTML format on the risk and safety information. The information is produced by the SAFE INVENTORY SYSTEM, an in-house automatic and multilingual software system for the products.

Because the MSDS system requires use different national database formats it is necessary with an exchangeable format for the hazard risk and safety information on hazardous chemicals.

The XML (eXtensible Markup Language) format seems to be a possible global exchange format for the risk and safety information on hazardous chemicals, where the different information to be searched can be tagged. This makes possible a fast list of risk and safety information on the internet from the different producers to all end users.

## 4. CONCLUSIONS

The internet has made it possible for a fast list of multilingual risk and safety information on hazardous chemicals.

A global harmonization and an agreed exchangeable format of the information will contribute to a higher global safety level in handling hazardous chemicals.