FINAL REPORT

SAFE Project File No SOC 97 201817

ASSESSMENT OF THE USEFULNESS OF MATERIAL SAFETY DATA SHEETS (MSDS) FOR SMEs

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Linz, April 1999

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SUMMARY

Objectives and Methodology

Safety Data Sheets (SDS) under EU Directives 91/155/EEC and 93/112/EC aim at providing professional users of dangerous substances and preparations with the information needed for safe handling of the products in the workplace and the environment. With the project “Assessment of the Usefulness of Material Safety Data Sheets for SMEs” we threw some light on the use of SDS in small companies. In particular we looked at the use and usefulness of SDS in SMEs and asked the users for their opinion about this information tool.

The research was jointly carried out in Austria, Germany, and the Netherlands by conducting and evaluating in total fifty interviews with representatives of SMEs. The interviewees were selected from four business sectors: car repair shops, plastic processing companies, metal works, and dental laboratories. In addition, sixteen suppliers of dangerous chemicals and fifteen representatives of umbrella organisations and experts in government organisations were interviewed.

Use of Safety Data Sheets in SMEs

Many SMEs stated that SDS were often not supplied to them unsolicited. However, SMEs were frequently not familiar with the fact that SDS are only obligatory with products which are labelled as dangerous. As a consequence those interviewees were not aware if they actually have received the SDS which they should receive according to legal requirements. Whether an SDS contains full, consistent and accurate information was hardly ever checked: The interviewees took the correctness of the contents for granted. SMEs rarely get in contact with their supplier to ask for additional information, although they consider suppliers to be the first ones they should contact if queries arise.

Sections 3 (Hazards identification), 4 (First-aid), 7 (Handling and storage) and 8 (Personal protection) of the SDS were the most frequently mentioned sections to be looked at. A majority of SMEs was not familiar with the concept and the meaning of R- and S-phrases and many SMEs found it difficult to interpret physical-chemical data and technical expressions.

Safety Data Sheets were hardly used for practical purposes inside the company. Collecting and filing Safety Data Sheets were often the sole activities with respect to SDS. Only occasionally SMEs used SDS for oral information and instruction of employees. Just a small minority of the companies used SDS to write up OHS-working instructions. Selecting personal protective equipment, setting up a dangerous substance inventory, and improving the information of employees were the most often mentioned consequences of using SDS.

Criticism and Suggestions of the Interviewees on the SDS Concept

The users in SMEs said that especially the information on precautionary measures provided in SDS is being poor and unspecific. They claimed that suppliers ought to pay more attention to practical measures such as information on personal protective equipment. SMEs found SDS too technical, too voluminous, but simultaneously too vague. According to the interviewees, the information in SDS is ill-structured and some sections contain redundant information. Hence, many SMEs, and some suppliers and experts with authorities, proposed improving the lay-out of Safety Data Sheets by means of graphic symbols, pictograms or colour codes. Many SMEs suggested a shorter format of Safety Data Sheets, or an additional one-page document.

The suppliers stated that they usually do not consider comprehensibility for SMEs when they compile SDS. Despite this fact a majority of the interviewees in SMEs said that SDS are comprehensible, even though many of those who said so had never made practical use of Safety Data Sheets.

Recommendations

Based on the findings in this research the following recommendations were derived which aim at improving the use and usefulness of Safety Data Sheets in SMEs:

- The use of safety signs (Directive 92/58/EEC) in SDS should be made compulsory.
- The legal requirements on how to compile Safety Data Sheets should be further specified in order to increase the quality of the information provided.
- Users in SMEs should be represented in working groups and advisory bodies engaged in the further development of Safety Data Sheets.
- The supplying of SDS should be made obligatory for preparations not labelled dangerous but containing dangerous substances above a certain threshold level.
- Models should be developed which allow electronic access, delivery, and use of Safety Data Sheets in SMEs.
- Improved inspection activities should check the compliance of suppliers of dangerous preparations with European and national SDS regulations.
- Hazard communication guides for SMEs should be developed which aim at integrating SDS into a broader hazard communication and management approach.
- Measures aimed at qualifying users in SMEs should be taken. Training and information programmes on preventive occupational health & safety management in small companies should be improved.
- Action to stimulate the translation of SDS information into easy to understand workplace instructions should be developed. The competent authorities should consider making workplace instructions derived from SDS information compulsory for users of dangerous substances.

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1. INTRODUCTION

1.1. PROJECT FRAMEWORK

EU directives 91/115 EEC and 93/112/EC specify the legal requirements in the European Union concerning the compilation and distribution of Safety Data Sheets (SDS) for dangerous substances and preparations. According to these technical directives SDS must be supplied to all industrial users of substances and products labelled dangerous within the meaning of Directive 88/379/EEC (Directive on dangerous preparations). The regulations imply that all companies in the European Union, large industries as well as small and medium sized enterprises (SMEs), using these substances or preparations ought to receive SDS from their suppliers under the conditions laid down in the national acts and ordinances meant to implement the European Directives in national law.

Although in recent years some attention has been paid to the method and practice of drafting these SDS and the quality of the SDS, little or no attention has been paid to the use of these SDS for the SMEs. The SDS contains extensive and specific information about the chemical and physical properties of a preparation, information on occupational and environmental hygiene, and all other areas required for a safe handling and use of the preparation in the workplace and the environment. Due to this concept of SDS it is to be assumed that specific (in-house) expertise is needed to usefully interpret SDS. This expertise in fact is generally assured in large industrial companies by the occupational health & safety and environmental experts and services of the company. However, in most cases in SMEs this expertise is lacking, and the use and the usefulness of the SDS for these companies may therefore be doubted. With this report we aim at throwing some light on this problem and provide some empirical data on the perception of SDS by suppliers, users in small companies and the authorities responsible for implementation and enforcement of SDS regulations in Austria, Germany and the Netherlands.

1.2. IMPLEMENTATION OF EU DIRECTIVES ON SDS IN AUSTRIA, GERMANY AND THE NETHERLANDS

Since the national regulations on SDS in all countries are based on EU Directives 91/115/EEC and 93/112/EC, the general legal situation concerning compilation and supply of SDS is quite similar. Most of the differences in the implementation are due to differences in the system of governance between Austria, Germany and the Netherlands.

Anyone who provides a dangerous substance or preparation has to supply professional users with an SDS. This includes manufacturers, but also importers of and dealers in dangerous substances and preparations. The SDS has to contain data about the health risks and the safety of the workers using the dangerous substance or preparations. It should also contain information on the ways to minimise these risks.

Currently a draft for a new EU Directive on dangerous preparations is in negotiation which might bring remarkable changes in SDS obligations. Under suggestions made for that draft professional users can request SDS for all dangerous substances and preparations which are offered publicly by retailers. Furthermore, a professional user can demand an SDS when the preparation is not classified as dangerous but contains more than 1 weight-% of substances with dangerous properties (or 0.2 vol.-% for gaseous preparations), or when the preparation contains substances for which OHS threshold limits have to be met. The label of these products must include the statement: „SDS available on request for professional users!"

An SDS should be handed to the professional user with the first shipment of the dangerous substance or preparation, and on the professional user's demand. If there are changes in the product which affect the classification or the labelling of the preparation, or new relevant data on the dangerous properties of the material, an adjusted SDS has to be made available to users in industry. Private consumers do not have to be supplied with an SDS under current European legislation.

1.2.1. IMPLEMENTATION OF DIRECTIVES 91/155/EEC AND 93/112/EC IN AUSTRIA

The Chemicals Act (ChemG 1996, BGBl I Nr. 53/1997)) came into force on March 1, 1997. It regulates dangerous substances and preparations, including safety and health aspects. Clause 25 of the Chemicals Act lays down the required form and layout of SDS, referring to the respective EU directives. More detailed regulations on SDS are part of the new Chemicals Ordinance („ChemV 1998") of the Federal Minister of the Environment which is still at the stage of drafting and negotiation. The new ordinance is still expected to come into force in 1999. The enforcement of the Chemicals Act and the Chemicals Ordinance lies with the Federal Ministry for the Environment, Youth and Family Affairs.

The Safety and Health Protection at Work Act (ASchG 1994, BGBl Nr. 450/1994) refers to MSDS as an information source for the employer responsible for occupational health and safety management.

According to the proposed draft of the Chemicals Ordinance it is obligatory to supply an SDS to professional users automatically at the latest with the first shipment for dangerously classified substances and preparations. If there is a revision of the SDS because of new information regarding health, safety and the environment, it has to be delivered to all professional users who have received the product within the last twelve months - provided with the remark *„Revised on <date>"*.

According to the Austrian draft of the new Chemical Ordinance every user (not just the professional user) has to be provided with an SDS if it is explicitly demanded.

The SDS can be sent as a written hard copy or can be delivered electronically. SDS have to be written in the German language and must refer to the Austrian regulations

regarding health, safety and the environment (ChemG 1996). The SDS should provide the professional user with the necessary information to minimise the health and safety risks for the employees, and environmental risks, by appropriate measures. Anyone who brings a dangerous substance or preparation into circulation – producers, importers, dealers – is responsible for submitting SDS (ChemG 1996, Art 27).

For dangerous preparations for which the European regulations state exceptions from general labelling obligations (e.g. compact metals, polymers and elastomers; propane, butane or liquefied petroleum gas), the information missing on the label must be stated with the SDS.

The responsibility to enforce and to check the compliance with SDS regulations lies mainly with the Austrian Federal Ministry of the Environment, Youth and Family Affairs and with the Chemicals Inspectorates of the Austrian provinces. The Central-Labour Inspectorate and the regional Labour Inspectorates oversee occupational health & safety regulations with respect to the use of chemical substances in the workplace.

1.2.2. IMPLEMENTATION OF DIRECTIVES 91/155/EEC AND 93/112/EC IN GERMANY

The implementation of the EEC directive 91/155/EEC in Germany occurred in the context of a major revision of the Ordinance on Hazardous Substances (Gefahrstoff-verordnung) in October 1993. Since May 1994 SDS have had to be provided in accordance with European legislation. The contents of the amending directive 93/112/EC were included in German regulations at a further revision of that Ordinance in September 1994.

The Ordinance on Hazardous Substances constitutes that piece of national legislation which contains the provisions on labelling and packaging of hazardous substances and preparations directed at producers, suppliers, and importers as well as the provisions on health and safety when such chemicals are commercially used, directed at employers and employees. The Ordinance is accompanied by a set of technical guidelines, so called "Technical Rules on Hazardous Substances" (Technische Regeln für Gefahrstoffe - TRGS), one of which contains detailed explanations and recommendations on the drafting of SDS (TRGS 220: Sicherheitsdatenblatt für gefährliche Stoffe und Zubereitungen - Safety Data Sheet for hazardous substances and preparations). That rule was published in September 1993.

Notwithstanding the fact that the Ordinance, which is updated from time to time, has to be passed at federal level, although with consent of the sixteen federal states, the enforcement of compliance, including the compliance with the provisions on SDS, resides solely with the factory inspectorates of the individual federal states. This leads to a situation in which differences in emphasis may arise in the enforcement of compliance due to different priorities in each federal state's factory inspectorate.

1.2.3. IMPLEMENTATION OF DIRECTIVES 91/155/EEC AND 93/112/EC IN THE NETHERLANDS

The decision to implement the EEC Directives in the Netherlands dates from April 1993. The regulations came into force for dangerous preparations on 1 July 1993 and for dangerous substances on 31 October 1993.

In the Netherlands the two EU Directives have been implemented in the Hazardous Substances Act, which is an important part of the environmental legislation in the Netherlands. Although most of the information contained in an SDS is focused on occupational health and safety aspects, the rationale for implementing the directives in environmental legislation is that the occupational health and safety legislation ("Arbeidsomstandighedenwet") is not broad enough to cover all aspects. Occupational health and safety legislation is exclusively directed only towards employers and employees. This means that importers and suppliers of dangerous substances and preparations would not be covered. Furthermore, in addition to information about occupational health, environmental information should be contained in the SDS, too.

Five different authorities are, in principle, responsible for the supervision of the SDS-legislation:

- Inspectorate for the Environment
- Labour Inspection
- Corps controllers dangerous goods ("het Korps controleurs gevaarlijke stoffen")
- Civil servants of import duties and excise duty ("Ambtenaren der invoerrechten en accijnzen")
- Inspectorate for health protection ("De Inspectie voor de gezondheidsbescherming")

The above mentioned authorities are those formally responsible. In practice the Labour Inspection and the Inspectorate for the Environment play the most important role in the supervision of the observation of the directive. The supervision of SDS-regulations is included in their regular visits to companies.

1.3. STRUCTURE AND CONTENTS OF THE REPORT

In this report, the findings of this project in Austria, Germany and the Netherlands are presented.[1] The report is structured as follows: In Chapter 2 we give a short overview of the objectives of the project and the methods deployed to meet the project aims. In Chapter 3 we describe the results of the interviews focusing on the usefulness and comprehensibility of the SDS in SMEs. In Chapter 4 we describe very briefly suggestions for improvements, arising from the interviews. In Chapter 5 we briefly discuss the findings of the interviews in the light of the results of previous research on the topic. In Chapter 6 we present our recommendations for improvements of the use and usefulness of Safety Data Sheets in SMEs.

1 For each country draft reports describing the situation found in more detail are available from the authors.

2. OBJECTIVES AND METHODOLOGY

The safety data sheet is a multi-purpose instrument for different groups of users. SDS aim at providing professional users of dangerous substances and preparations with the information needed for safe handling of the products in the workplace and the environment. This covers occupational health and safety issues, but also environmental requirements, transport regulations, first-aid, storage and incident information. Occupational health doctors, safety engineers, occupational health & safety services, and environmental staff personnel support the employer in meeting the legal obligations and informing the employees about health & safety measures to be taken. However, safety data sheets are also important for the competent authorities (labour inspectorate, environmental inspectorate and other authorities responsible for the enforcement of regulations on chemicals) to be able to check the compliance of companies and individuals with the regulations.

Whereas the labelling of chemicals provides the users with the minimum hazards information, the SDS is the source of additional, more detailed information on the properties of chemical substances and preparations. All professional users of dangerous substances ought to be in a position to have direct access to SDS. According to OHS regulations in Austria, Germany and the Netherlands employers must ensure that workers receive comprehensible information and instructions on how to work safely with dangerous products, taking into account the professional background of the workers and the specific situation in the workplace. The SDS is an important tool for the employer in his or her striving to comply with this legal requirement.

2.1. OBJECTIVES

The aim of this project was to gain insight in the use and the usefulness of SDS in SMEs. To examine the use and the usefulness of SDS for SMEs we aimed at answering the following questions:

- Who makes use of SDS in SMEs?
- Which information of the SDS do the users make use of?
- For what purpose is the information used?
- How do the users judge the quality of SDS?
- Why do certain users not make use of SDS?
- How do users of dangerous substances and suppliers of SDS communicate?
- What have been the consequences of the use of SDS in SMEs?

On basis of the outcome of these questions, options for the improvement of the quality and comprehensibility of SDS were derived to meet the specific needs of SMEs.

2.2. METHODOLOGY

This project was carried out by conducting interviews with representatives of SMEs, suppliers of dangerous chemicals, umbrella organisations and experts in governmental authorities. Further, we examined the implementation and the enforcement of the EU Directives in the three participating countries and looked at what research had already been carried out on this subject in recent years. For this purpose, an on-line search in the scientific literature was carried out (SCI, SSCI, Med-line, Tox-line) and additional searches were carried out via Internet.

2.2.1. SELECTION OF INTERVIEWEES

Interviews were carried out with SMEs, suppliers of SDS, experts with governmental departments and representatives of umbrella organisations.

Small and medium sized enterprises

In the case of SMEs, four business sectors were selected, namely car repair shops, the plastic processing companies, metal works (specifically galvanic companies) and dental laboratories. The rationale for focussing on some sectors rather than choosing SMEs from all fields of business was that firstly the selection should ensure that interviews would be carried out with companies actually working with dangerous preparations and secondly, the companies chosen should be in a way representative of the chemical products used, in other SME-sectors as well. However, simultaneously the selection should not neglect less well documented SME-sectors with respect to occupational health and safety. The selection of the companies should represent both the production and the service sector. A brief description of the four sectors covered in this study is given in Appendix 2.

The SMEs interviewed do not represent a random sample of the sectors, since the contacts to the companies were predominantly made by contacting sector organisations of the SMEs, asking either for lists of member companies, or more specifically, asking for names of representatives in SMEs willing to take part in this research and share their practical experience of working with SDS. Contacts to interviewees in small companies were also provided by labour inspectors, trade union representatives and environmental and occupational health & safety agencies.

Furthermore we aimed at excluding small companies which said they did not know or use SDS even if the company actually worked with dangerous substances and preparations.[2] However, we realised in the course of this research that SMEs interpret the term “use” quite arbitrarily: Being concerned with dangerous substances in the company and having received SDS was for many interviewees equivalent with using SDS. But still we can assume that the set of companies interviewed in this research is

2 22 out of 62 car repair shops and plastics processing companies contacted by telephone in the Netherlands stated not to use Safety Data Sheets.

significantly biased towards rather “active” and “aware” companies in terms of health, safety and environmental issues. Some of the interview partners in the SMEs were representatives of their respective sector organisation (e.g. chamber of commerce) on a regional or national level. Some basic characteristics of the SMEs interviewed are shown below in Table 1 to Table 4.

Suppliers of Safety Data Sheets

Representatives of companies which draft or provide SDS were interviewed. Most of the supplier companies provide products for the SME-sectors selected. Companies interviewed comprise producers and suppliers of paints and lacquers, products used in the metal industry such as processing and cooling fluids, producers of chemicals for galvanisation, suppliers of products for plastic manufacturing, traders of organic solvents, and suppliers of products for dental laboratories.

The size of the companies contacted varies significantly in magnitude. The number of employees ranges from the small supplier with 30 people up to subsidiaries of multinational companies with more than 800 local employees and tens of thousands world-wide.

Authorities and umbrella organisations

Interviews were carried out with representatives of the Labour Inspectorates, the ministries of the Environment and the Chemicals and Environmental Inspectorates in the respective countries. In every country the association of the chemical industry was contacted and asked for an interview. Sector organisations of the sectors covered were contacted and informed about the project. More information was gathered through interviews with experts in occupational health & safety services and occupational health and safety agencies. Appendix 1 gives information on the organisations contacted and interviewed.

2.2.2. INTERVIEW QUESTIONNAIRES

For all three groups of interviewees, structured questionnaires were jointly developed and used in all participating countries (Appendix 1). For the SMEs, the interview started with a characterisation of the company and the person interviewed. Afterwards, questions were asked about the obtaining of the SDS from the suppliers, followed by the organisation of the SDS in the company (who uses them and for what purpose). Furthermore, questions were asked about the goals of the usage of the SDS and about the sections of the SDS that were used to reach these goals. The comprehensibility of the SDS was asked about and checked for three specific sections of the SDS: the R/S phrases, the personal protective equipment and the physical chemical properties. Finally people were asked about the consequences of the usage of the SDS and possible improvements. In the interviews with the drafters and the governmental and umbrella

organisations, their specific opinion about these subjects was elicited and they were confronted with the situation as concluded from the interviews.

2.2.3. PERFORMING AND EVALUATING THE INTERVIEWS

The interviews took place in the company where the interviewee worked and lasted in general between 45 and 120 minutes. In total, 81 interviews were conducted. 50 interviews were carried out with representatives in SMEs, mostly with shop owners or managing directors. Sixteen interview partners came from suppliers of industrial chemicals and drafters of SDS[3]. Thirteen representatives of authorities concerned with SDS-regulation and enforcement of environmental and occupational health & safety regulations were contacted and interviewed. Interviews with three representatives of umbrella organisations of the chemical industry completed the set of interviewees. A written record was taken for each interview. A part of the interviews was audiotaped. The information given in the interviews was transcribed. Codes were assigned to the distinct thematic parts of the interview protocols. The categories were evaluated by a qualitative analysis of the text fragments.

Due to the rather small number of interviews and the bias of the selection of interviewees described above, the information obtained in the interviews only allows a qualitative evaluation and interpretation. For only a few items did we count frequencies of answers given if the nature of the question easily allowed a categorisation of the answers, respectively, the interviewee could choose from a set of answers provided by the interviewer. Apart from frequencies no statistical tools were applied to the data collected.

Tables 1 to Table 4 give information on the number of interviewees per sector, company size, and position of the interviewee in the company and the level of education.

Interviews	**A**	**D**	**NL**	**Total**
SMEs	**20**	**10**	**20**	**50**
Car repair shops	7	2	5	14
Plastic processing companies	5	2	5	12
Metal working and galvanic companies	3	2	6	11
Dental laboratories	5	4	4	13
SDS-Suppliers	**6**	**5**	**5**	**16**
Governmental and umbrella organisations	**5**	**5**	**5**	**15**
Total N=	**31**	**20**	**30**	**81**

Table 1: Number of interviews per sector

3 This number includes an interview with the managing director of the leading SDS-Software company in Europe.

Size of Company	A	D	NL	Total
10 employees and less	7	4	3	14
11-20 employees	6	3	7	16
21-50 employees	1	3	7	11
51-100 employees	5	0	3	8
101 employees and more	1	0	0	1
Total N =	**20**	**10**	**20**	**50**

Table 2: Size of company

Position of Interviewee	A	D	NL	Total
Shop owner	16	5	12	33
Managing director	1	0	4	5
Head of department / foreman	1	3	3	7
Shop steward	2	0	0	2
Safety representative	0	1	1	2
Occupational health & safety expert	0	1	0	1
Total N =	**20**	**10**	**20**	**50**

Table 3: Position of the interviewees with SMEs

Highest education of Interviewee	A	D	NL	Total
Apprenticeship, lower / intermediate technical education	5	1	10	16
Master craftsman's diploma, higher secondary education	7	6	6	19
Higher technical school	7	2	3	12
University graduate	1	1	1	3
Total N =	**20**	**10**	**20**	**50**

Table 4: Highest level of education of interviewees

3. USE AND USEFULNESS OF SDS IN SMES

The aim of this research was to assess the practicability of SDS and the experience of small companies with this important instrument of European dangerous substance policy. The use, usefulness and comprehensibility of Safety Data Sheets (SDS) was evaluated by performing interviews with users of dangerous materials in SMEs, with suppliers of dangerous products, with experts in authorities and with representatives of the chemical industry and the sector organisations in the participating countries. The evaluation of the interviews provides a good qualitative picture of the state of affairs with using and understanding of Safety Data Sheets in small companies.

3.1. ATTITUDE TOWARDS SAFETY DATA SHEETS

The attitude of the SMEs seemed to vary among the three countries in which interviews were conducted. The situation towards SDS seemed to be most hostile in Austria, while in Germany and the Netherlands SMEs show a higher acceptance of SDS.[4]

In Austria, the majority of the SMEs interviewed showed a striking indifference towards SDS. A considerable number of the Austrian interviewees expressed openly their animosity towards bureaucratic health, safety and environmental regulations, for which they consider SDS an example: Managing SDS is merely just one more bureaucratic burden placed on small companies. Just a few Austrian interviewees said they had a positive attitude towards safety data sheets.

In the Netherlands and in Germany however, most interviewees had a positive attitude towards the existence of SDS and the availability of SDS in their company.

Attitude of SMEs towards SDS	**A**	**D**	**NL**	**Total**
(Rather) positive opinion	2	6	17	25
(Rather) negative opinion	4	3	0	7
Don’t know, indifferent	14	1	3	18
Total N =	**20**	**10**	**20**	**50**

Table 5: Attitude of interviewees in SMEs towards SDS

Evidence from the interviews indicated that many SMEs have just a very superficial knowledge of SDS. In Austria, in two cases it was necessary to clarify at the beginning of the interview what an SDS actually is, since interviewees had difficulties in distinguishing

4 Differences in the attitude towards SDS between the countries found in this study might be the result of differences in the selection of interviewees. In Germany some interviewees had already participated in OHS-promotion projects in recent years and in the Netherlands the companies selected for the interviews described themselves as „users“ of SDS. From that one can assume an above average awareness and commitment to OHS issues. On the other hand, some of the interviewees in Austria were active members and representatives of the Chamber of Commerce, for whom „fighting red tape“ is a central policy issue.

SDS from other documents, e.g. dispatch notes for hazardous waste, technical information for products provided by the supplier, and OHS information leaflets.

Summary: What do SMEs know and think about SDS?
• **The attitude towards SDS varies among the countries. In Austria many SMEs do not bother about SDS at all and often consider them just as a source of bureaucracy. SMEs in the Netherlands and in Germany show a far more positive attitude towards SDS** • **Some SMEs, particularly in Austria, have difficulties in distinguishing SDS from other information and documents**

3.2. HOW DO SMEs GET SAFETY DATA SHEETS?

According to the legal regulations in Austria, Germany and the Netherlands, the delivery of an SDS is obligatory for each first shipment of a substance or preparation which is labelled as dangerous. Additionally, suppliers are legally obliged to send an update of an SDS in case of relevant changes in composition or labelling of the product.

3.2.1. SUPPLYING SAFETY DATA SHEETS – THE JUDGEMENT OF THE USERS

In order to see whether the obligations mentioned above are actually fulfilled the interviewees in the SMEs were asked if, how and when they receive an SDS for their product. Furthermore, we asked SMEs to describe the situation with respect to receiving updates of Safety Data Sheets.

How do you get your Safety Data Sheet?	A	D	NL	Total
Provided unsolicited by suppliers	3	2	6	11
Sometimes sent by suppliers, sometimes demanded	3	3	8	14
Predominantly / only on demand	11	5	6	22
Other, don’t know	3	0	0	3
Total N=	**20**	**10**	**20**	**50**

Table 6: Supply of Safety Data Sheets

Of the interviewed SMEs eleven stated the SDS were almost always provided by the supplier, and fourteen stated that the SDS were sometimes provided by the supplier with the shipment of the product but other times they had to ask the supplier. Twenty-two interviewees stated that most of the time they had to demand SDS themselves. Especially for dental laboratories in Austria and the Netherlands the number of

automatically provided SDS is low. Many dental laboratories said they had to ask the supplier explicitly for an SDS.

Especially retailers of dangerous products were said to be not always up-to-date with legal requirements. Interviewees emphasised the reluctance of suppliers to deliver SDS. However, in general, the interviewees conceded that the situation had improved over the past few years and more suppliers now deliver SDS automatically compared with some years ago.

3.2.2. SUPPLYING SAFETY DATA SHEETS – POSITION OF THE SUPPLIERS

The suppliers we interviewed were asked in which way they dealt with the legal obligation to provide Safety Data Sheets. Generally, it turned out that most of the suppliers of dangerous materials are very aware of their responsibilities. According to most of the suppliers SDS are always sent upon first shipment of a product. However, in Austria at least two of the companies stated they sent Safety Data Sheets only if requested by a customer since the supplier presumed that SDS are anyway hardly used. According to these firms supplying SDS just on request helps to avoid wasting time and resources.

Most drafters stated that they sent updates of SDS whenever there were relevant changes in the SDS. However, especially in Germany many suppliers openly admitted just to providing updated SDS together with the shipment of a new purchase of the particular product.

Modern information and communication technology makes it simple to document and trace each delivery to a customer. Some suppliers have implemented automatic routines in order to check if a customer has received an SDS, whether the products delivered are dangerous or not, and who dealt with the delivery. Safety Data Sheets are either sent by regular post or are attached to the shipment of the product. One company stated that it sent a covering letter with the SDS to the customer. This is thought to raise the relative importance of the SDS for the users. Some firms are considering providing, or actually do provide, diskettes as a means of sending SDS to their customers.

The answers given by the SMEs and the suppliers of dangerous preparations seem to indicate that most, but not all suppliers do fulfil their legal obligation to provide an SDS for dangerous products. However, it should be realised that an SDS only has to be provided for products classified as dangerous. Upon further questioning, many SMEs, particularly in Austria and in the Netherlands, did not seem to be aware of this. Many of these companies were not able to distinguish between a dangerous and a non-dangerous product. The fact that it can be read from the product label was not known to them.

Summary: How do SMEs get Safety Data Sheets?
• **In all countries small companies claim that SDS are often not supplied unsolicited** • **SMEs in Austria and the Netherlands are frequently not familiar with the fact that SDS are only obligatory with products which are labelled as dangerous** • **SMEs in Austria and the Netherlands often find it difficult to tell whether or not a product is dangerous**

3.3. SDS-MANAGEMENT IN SMALL COMPANIES

3.3.1. CHECKING AVAILABILITY AND CONTENTS OF SDS

A majority of the interviewees stated that they checked, at least from time to time, whether SDS are available for all dangerous products in the company. On the other hand, many companies were not certain if they had got all the SDS they actually should have obtained. This may be because of a general lack of commitment, or because the SDS arrived at another department of the company and failed to reach the person collecting the SDS.[5]

Companies with an ISO certificate were clearly more aware of the completeness and up to date state of the SDS archive, since this might build an essential element of their management system.

Do you inquire after SDS if not delivered unsolicited?	**A**	**D**	**NL**	**Total**
Yes, frequently	6	6	7	19
Every once in a while	4	0	8	12
Seldom, in special circumstances	3	2	3	8
No, never	4	2	2	8
Don’t know, N/A	3	0	0	3
Total N =	**20**	**10**	**20**	**50**

Table 7: Inquiring after Safety Data Sheets

According to legislation, the responsibility for the correctness of the information in the Safety Data Sheets is held by the person responsible for bringing the product on the market. However, we also asked the companies whether they check the data contained in SDS, since missing sections or obviously inconsistent information in the document

5 This finding refers particularly to the situation in Austria and the Netherlands.

may demand further inquiries in order to take the necessary measures for a safe handling of the product.

Most of the companies stated that they never checked the contents of Safety Data Sheets on the plausibility and consistency of data provided. Many SMEs said they had good faith in the quality of the data provided. The companies assumed that SDS were drafted correctly since it is the legal responsibility of the suppliers to ensure correct information in SDS. Hence, this is a reason for SMEs not to check SDS.

Furthermore the companies argued that they were not experts in chemistry, physics or medicine and thus they had anyway to rely on the data. Only in a few cases did the interviewees state that they checked the data for their correctness. However, the means of this check did in many cases not become clear and the interviewees were not able to explain how they checked the data. If the company is supported by an occupational health & safety service, the data are frequently checked by the external service. Some companies said they compared SDS with other SDS they had got, e.g. the previous version of the SDS for the same product. Just a very few companies use information from books and databases. But in most cases checking SDS just seems to be a synonym for taking a skimming look at SDS.

Number of companies that check SDS	**A**	**D**	**NL**	**Total**
Checking whether SDS gives complete particulars	1	3	3	7
Checking whether information is correct	1	2	4	7
Checking whether information is consistent	0	2	0	2
Checking whether SDS is accurate	2	2	0	4
No check of SDS data, N/A	16	6	13	35
Total N = 50 interviews, multiple response				

Table 8: Checking Safety Data Sheets

Besides a lack of commitment of the employers with respect to OHS issues, heavy time pressure on managers and workforce and poor or insufficient know-how seems to contribute to the situation found. The findings do not provide evidence to assume a correlation between the formal education or qualification of the shop owner or the managing director and the propensity to check SDS information in the SMEs.

3.3.2. COMMUNICATION BETWEEN USERS AND SUPPLIERS

Good communication between users and suppliers of dangerous preparations is crucial when SDS are not delivered, regardless of the reason, and when the user doubts the reliability or consistency of the data provided. Last but not least communication between users and suppliers is necessary when the customer faces problems in understanding the information in SDS.

If SMEs were asked the question who they would ask if the information in an SDS was unclear to them the vast majority named their supplier. However in reality, SMEs rarely ask. When we asked them whether they actually did get in contact with their suppliers in case of unclear information most of the companies stated that they “never” or „seldom“ asked their supplier for clearer or additional information.

Unless severe health, safety, or environmental problems occured in connection with substances used in the company, SMEs were reluctant to ask suppliers for information. Inquiries on recently introduced products were more frequently reported than inquiries on products which had already been purchased for a longer time. Requests by customers asking for product properties are another trigger for SMEs to get in contact with the supplier.

In some cases interviewees stated that they used other channels to gather the information they needed. Getting in contact with an occupational health & safety service is one option. Other companies mentioned informal contacts such as experienced friends, colleagues in other companies, or sales representatives.

The situation found in SMEs is consistent with the assessment of the suppliers who stated that they faced feedback and inquiries from customers in small companies, but not very often. According to the suppliers not all of these inquiries are related to Safety Data Sheets. Many queries from small companies do refer to technical aspects of processing and applying the product, and not to OHS-issues.

Summary: Management of Safety Data Sheets in SMEs

- **A considerable number of SMEs, especially in Austria and the Netherlands, are not aware if they actually have received the SDS which they should receive according to legal requirements**
- **Only some of the SMEs inquire after an SDS when it is not delivered in the first place**
- **Whether an SDS contains full, consistent and accurate information is hardly ever checked. The correctness of the contents is taken for granted.**
- **SMEs rarely get in contact with their supplier to ask for additional information, although they consider suppliers to be the first ones they should contact if queries arise**

3.4. USE OF SAFETY DATA SHEETS IN SMES

3.4.1. FOR WHAT PURPOSES DO SMES USE SAFETY DATA SHEETS?

European and national legislation do not specify in detail for what purposes an SDS has to be used in companies. However, according to occupational health & safety regulations the employer is obliged to evaluate and minimise the risks posed by hazardous materials, to set up a dangerous product inventory and to inform and instruct the workers about the safe handling of these products. For all these legal tasks SDS form an important source of information.

Evidence from the interviews with SMEs showed clearly that the majority of the companies just file Safety Data Sheets without taking any further action. Some interviewees stated explicitly that they considered any processing or practical application of SDS as useless. To the open question *„Do you use SDS practically in your company“* many interviewees responded that they not use SDS at all!

Do you practically use SDS in your company?	**A**	**D**	**NL**	**Total**
Yes, frequently	0	3	6	9
Once in a while	5	3	6	14
Seldom, in special circumstances	5	3	3	11
No, never	9	1	4	14
Don’t know, N/A	1	0	1	2
Total N=	**20**	**10**	**20**	**50**

Table 9: Use of Safety Data Sheets in SMEs

Further to the use of SDS in the companies we asked the interviewees how they proceeded with the SDS they get from their suppliers. The majority of the interviewees mentioned *collecting and filing* as the sole activities with respect to SDS. For some SMEs even putting SDS in a file was too ambitious a task.

What do you do with SDS inside the company?	**A**	**D**	**NL**	**Total**
Collecting and filing SDS	18	10	20	48
Distribution of information to departments	2	3	9	14
Editing / processing SDS information	0	2	4	6
Don’t know, N/A	2	0	0	2
Total N = 50 interviews, multiple response				

Table 10: What happens to SDS in the companies?

Usually the SDS file is made accessible to all employees. However, in reality employees hardly make use of this opportunity. According to the interviewees, even in cases where SDS are available on the shopfloor the workers do not read the SDS provided. This result is also reflected in the answers given to the question who actually uses SDS in the company:

Who actually uses SDS in your company?	**A**	**D**	**NL**	**Total**
Employer / shop owner / managing director	11	5	9	25
Occupational physician	0	0	0	0
Waste / environmental manager	1	1	0	2
Employees	2	6	8	16
Safety representatives	2	4	2	8
Occupational health & safety expert	1	2	6	9
Shop steward	2	0	0	2
Other persons	2	0	2	4
Total N = 50 interviews, multiple response				

Table 11: Users of Safety Data Sheets in SMEs

For what purposes do you use SDS?	**A**	**D**	**NL**	**Total**
Meeting demand of labour inspectorate or another authority	18	8	0	26
General product information	0	2	7	9
Drafting of dangerous substance inventory	5	3	1	9
Conducting risk assessment exercise	6	3	12	21
Searching for product substitutes	1	4	1	6
Technical prevention measures	1	5	0	6
Selecting personal protective equipment	3	6	7	16
Information and training of employees	3	6	2	11
Environmental measures	5	4	4	13
Information about transport regulations	0	3	0	3
Information about first-aid measures	0	5	0	5
Information about fire & explosion prevention	2	2	0	4
Incident prevention and measures	0	3	0	3
Other purposes	2	3	6	11
Total N = 50 interviews, multiple response				

Table 12: Purpose of using Safety Data Sheets

Besides filing SDS, oral instruction of the workers on how to handle dangerous substances safely was the most frequently mentioned use of Safety Data Sheets. Many

companies, especially in Austria, had not realised the legal responsibility of the employer to inform and instruct workers about the dangerous products they work with. In Germany and in the Netherlands at least a few companies said that they translated the information provided in SDS into more comprehensible OHS-instructions for the workplace.

In the course of the interviews we asked the interviewees for what purposes SDS were used and what they consider the rationale of having SDS available in the company was. In the first place we confronted the interviewees with the open question “For what purposes do you use SDS in your company” and continued by presenting them with purposes for which SDS potentially can be used.

To conclude, managers in SMEs seem not to be impressed with the practical usefulness of SDS. A considerable part of the interviewees stated that they „*never*“ or „*rarely*“ made use of SDS. Companies predominantly concern themselves with SDS because of requests of the labour inspectorate or of other authorities, mainly in connection with the licensing process for new installations or enlargement of the business. For many managers in SMEs it seems to be difficult to think about sensible purposes for which SDS can be used. Besides, the managers mentioned their lack of resources in terms of time and labour as being the crucial reasons for not making use of SDS.

3.4.2. WHICH SECTIONS OF THE SAFETY DATA SHEETS DO SMES USE?

Most SMEs had difficulties in pointing out which sections they really use because usually many of them only look cursorily at several sections before filing the SDS. A position often heard in the interviews was that since the companies have already worked for years with the same substances, they actually do know very well what the risks are. This was an important reason for them not to take the SDS too seriously, and to judge risks potentially posed by dangerous substances predominantly according to their experience.

The sections which were looked at by some companies were the section of the risks (R-phrases) and first aid measures, and also the sections on fire measures, physical chemical properties, handling and storage and personal protective equipment deserved some attention. However, which sections are used can vary widely between companies. While some companies stated that they only scanned the first aid measures, other companies stated that they primarily used the physical characteristics (e.g. flash point) of the product. One company stated that they only looked at descriptive sections of the SDS and not at sections containing raw data because of the readability of the former sections.

In Austria and the Netherlands the sections on transport information (section 14), regulatory information (section 15) and other information (section 16) were rarely mentioned as being used or looked at.

Which sections of an SDS do you use?	A	D	NL	Total
Product identification	N/A	7	N/A	7
Composition	8	5	8	21
Hazards identification	10	9	12	31
First-aid measures	4	9	15	28
Fire fighting measures	4	4	8	16
Accidental release measures	2	5	8	15
Handling and storage	3	7	10	20
Exposure control, personal protection	7	8	11	26
Physical and chemical properties	2	4	6	12
Stability and reactivity	0	3	5	8
Toxicological information	2	6	4	12
Ecological information	3	5	3	11
Disposal consideration	5	6	2	13
Transport information	0	4	1	5
Regulatory information	0	5	1	6
Other information	0	3	0	3
Total N = 50 interviews, multiple response				

Table 13: Use of SDS sections by SMEs

However, one ought to bear in mind that the answers given by the interviewees might not only depict the actual use of the distinct sections of a Safety Data Sheet (because in a narrow sense many companies do not use SDS at all), but may reflect rather the relative importance the interviewees attribute to each section of a Safety Data Sheet.

Summary: Use of Safety Data Sheets in SMEs

- **Safety Data Sheets are hardly used for practical purposes at all. Collecting SDS is primarily the consequence of the legal requirement to do so.**
- **Collecting and filing Safety Data Sheets is frequently the sole activity with respect to Safety Data Sheets**
- **Besides the person responsible for collecting SDS often nobody else comes in contact with Safety Data Sheets**
- **Further handling of SDS information occasionally means oral information of employees. Just few companies use SDS to write up OHS-work instructions**
- **Sections 3 (Hazards identification), 4 (First-aid), 7 (Handling and storage) and 8 (Personal protection) were the most frequently mentioned sections to be looked at**

3.5. CONSEQUENCES OF USING SAFETY DATA SHEETS

More than half of the interviewees stated that up till now the SDS have not had any practical consequences at all. Not surprisingly, most of the companies which said that the sole use of SDS is to file them were not able to mention any visible effect of having SDS available.

Instead of pointing out tangible effects, many companies made some general remarks about consequences, particularly that the availability of SDS had led to a greater awareness in the company about safe handling of chemicals and an improvement in terms of communication of potential risks to workers. However, they said SDS were only partly responsible for this rise in awareness. Other important developments that were mentioned in this respect were the new obligation to compile a risk inventory and evaluation.

A few companies specifically stated that the SDS had contributed to safer working conditions in the company while others emphasised now paying more attention to environmental and occupational health issues in general. Only in a minority of the companies have SDS lead to visible effects such as the installation of local ventilation in the company.

What practical consequences have the use of SDS in your company had so far?	**A**	**D**	**NL**	**Total**
No consequences	12	2	8	22
Dangerous substance inventory set up	5	3	0	8
Substitution of dangerous products	1	6	3	10
Technical or organisational measures	0	3	3	6
Selection of personal protective equipment	3	6	3	12
Improvement of information of employees	2	6	0	8
Drafting instructions for safe product handling	0	2	0	2
Environmental measures	0	4	0	4
Drafting first-aid guidelines	0	4	0	4
Drafting incident management guidelines	0	2	0	2
Drafting fire prevention plan	0	0	0	0
Other measures	0	2	2	4
Total N = 50 interviews, multiple response				

Table 14: Practical consequences of using Safety Data Sheets

We therefore presented the interviewees with a list of possible measures which might be taken in connection with SDS. In Austria the SMEs most frequently mentioned *"Dangerous substance inventory set up"* and *"Selection of personal protective equipment"* as results of using SDS. Safety Data Sheets provide information essential to carrying out these obligations. In Germany, the companies mentioned most frequently

"Selection of personal protective equipment", *"Improvement of information of employees",* and *"Substitution of dangerous products*". *"Selection of personal protective equipment"* (gloves, breathing masks) and *"Substitution"* were also most frequently mentioned in the Netherlands as being the practical consequences of using SDS. Astonishingly, even some of those companies who said in the first place that they never useed SDS mentioned practically effects of SDS!

Summary: Practical Consequences of Safety Data Sheets
• **Selecting personal protective equipment, setting up a dangerous substance inventory, and improving the information of employees are the most frequently mentioned consequences of using SDS in SMEs** • **Many SMEs could not name any practical consequence of using SDS besides referring to actions SMEs are obliged to carry out, such as writing up a dangerous substance inventory or choosing the appropriate personal protective equipment** • **Safety Data Sheets may – in interplay with other instruments – contribute to an increased awareness of occupational health and safety issues** • **Choosing personal protective equipment dominates the measures taken related to SDS**

3.6. COMPREHENSIBILITY OF SAFETY DATA SHEETS

3.6.1. SMES' JUDGEMENT OF SDS COMPREHENSIBILITY

To gain some insight into whether or not the users in SMEs understand the information contained in the SDS the interviewees were asked about their general assessment of the comprehensibility of the Safety Data Sheets.

Is the information provided in SDS comprehensible to you?	**A**	**D**	**NL**	**Total**
Yes, predominantly comprehensible	5	6	9	20
Just partially comprehensible	5	2	9	16
Hard to understand	5	0	2	7
Incomprehensible	2	2	0	4
Don't know, N/A	3	0	0	3
Total N=	**20**	**10**	**20**	**50**

Table 15: SMEs judgement on comprehensibility of Safety Data Sheets

In a number of cases the SDS as a whole were judged as comprehensible. However, the SDS users expressed a number of general points of criticism. The information was found to be too technical and the order of the information was found to be partly illogical. Furthermore users complained about useless repetition of information under different sections. Generally, managers consider Safety Data Sheets too complicated for their employees to understand. Other issues the interviewees mentioned were poor lay-out of the document, too much text and information, and too many slots with no entry.

Further we asked the interviewees to point out which of the sections of an SDS are in particular difficult to understand. More than one third of the interviewees were not able to elaborate on the aspects of comprehensibility of distinct sections of an SDS. Many interviewees seemed never to concern themselves in such detail with SDS as to be able to answer that question.

The response of the interviewees can be summarised as follows: Users in small companies especially consider information contained in section 2 (Composition) and section 8 (Exposure control) the most difficult to understand. Section 11 (Toxicology), section 14 (Transport regulations) and section 15 (Regulations) were also frequently mentioned as posing problems in terms of them being able to interpret the data. Several interviewees found terms like *"Vapour pressure"*, *"Occupational exposure limit"*, and *"CAS-number"* incomprehensible. Terms like *R-phrases*, *S-phrases*, *Flash point*, *waste classification numbers*, and *references to standards* were also said to be incomprehensible.

The findings show that SMEs particularly find those SDS-sections hard to understand which tend to contain technical terminology, as well as chemical, physical, and toxicological expressions and figures. A further interesting point is that SMEs rarely use those sections of the SDS which experts and suppliers in their interviews pointed out as being very important for small users!

3.6.2. FAMILIARITY OF USERS WITH SDS-TERMINOLOGY

In the course of the interviews the interviewees were asked whether they were familiar with the terms *"personal protective equipment"*, *"R-phrases and S-phrases"*, *"vapour pressure"* and *"flash point"*. Furthermore the interviewees were asked to give an example, or to give an interpretation of the terms.

Most of the interviewees were able to explain the meaning of "personal protective equipment" adequately. However, if additional data and abbreviations (e.g. references to MAK, MAC, TLV) are used in this section many companies do not understand the meaning of the information provided.

Rather surprisingly many of the SMEs were not familiar with the concept of R-phrases and S-phrases. Half of the interviewees who actually said they were familiar with these terms, could not provide a correct explanation. For example it was not clear that the R-phrase exactly corresponds with the text following the number. Thus, in the case of *R10*

flammable they understood the text 'flammable' but mentioned that they had to check the exact meaning of R10.

Are you familiar with the following terms used in SDS?	R&S-phrases			PPE			Phyisical-chemical data				
							Va.press.		Fp.		General
	A	D	NL	A	D	NL	A	D	A	D	NL
Familiar, correct interpretation	2	5	10	18	10	15	3	3	5	8	10
Problems with interpretation or unfamiliar with concept	16	5	10	0	0	2	15	7	13	2	5
Do not use section; N/A	2	0	0	2	0	3	2	0	2	0	5
Total N = 50											

Table 16: Familiarity with technical terms used in Safety Data Sheets

A majority of the companies interviewed had considerable difficulties to interpret physical-chemical data correctly. Many interviewees stated that they were not familiar with the term "*vapour pressure*", and just a quarter of the interviewees could provide a correct interpretation of the term "*flash point*". Some other interviewees confused "*flash point*" with "*ignition temperature*".

3.6.3. TOLERANCE OF USERS IN SMEs TOWARDS AMBIGUITY

We asked the interviewees what they did when they found themselves in the position not being able to understand or interpret the information contained in a Safety Data Sheet. Many companies stated that if the information in an SDS *was* unclear, they *would* ask the supplier for more information. However, not many actually do so. A considerable number of the interviewees just ignore incomprehensible or ambiguous information. Companies who are in contact with an occupational health & safety service ask them for support. A few other companies stated that they sought for more information in books and databases, and some looked for support from colleagues in other companies.

What do you do when SDS information is incomprehensible?	A	D	NL	Total
Never / rarely happens	0	0	3	3
Ignore information	11	3	9	23
Ask for help from people inside the company	0	0	0	0
Ask supplier / seek other external help	4	6	8	18
Don't know, N/A	6	1	0	7
Total N = 50 interviews, multiple response				

Table 17: Actions following incomprehensible SDS-information

3.6.4. DO SUPPLIERS CONSIDER COMPREHENSIBILITY FOR USERS WHEN DRAFTING SAFETY DATA SHEETS?

None of the suppliers interviewed said they paid particularly attention to the comprehensibility of Safety Data Sheets for non-expert users and users in small companies, but proceeded according to the requirements as laid down in the EU-directives and in the national regulations. Most of the suppliers stressed the fact that making hazard information on dangerous substances comprehensible for workers is not their primary task, but the responsibility of the companies using the products.

Summary: Comprehensibility of Safety Data Sheets

- **A majority of the interviewees said that SDS are generally comprehensible (however, many of those who said so had never made practical use of Safety Data Sheets)**
- **SMEs mainly criticise the technical language deployed in SDS, the illogical order of sections, and the excessive repetition of information**
- **SMEs rarely use Section 2 (Composition), Section 8 (Exposure control) and (in Austria and the Netherlands) Section 15 (Regulatory Information). According to authorities and suppliers, those are the most important sections for users in small companies**
- **A majority of SMEs is not familiar with the concept and the meaning of R- and S- phrases**
- **Most SMEs are familiar with the information about personal protective equipment in SDS**
- **Many SMEs find it difficult to interpret physical-chemical data, and technical expressions such as vapour pressure, flash point, TLV-value and CAS-number**
- **Suppliers usually do not consider comprehensibility for SMEs when compiling SDS**

4. CRITICISM AND SUGGESTIONS OF INTERVIEWEES

4.1. MAIN POINTS OF CRITICISM OF SAFETY DATA SHEETS

4.1.1. POOR INFORMATION ON PRECAUTIONARY MEASURES

Many companies, and some of the interviewed experts, located the crucial shortcoming in many SDS in insufficiently described occupational health, safety and environmental measures to be taken for a safe handling of the product. The practical usefulness of the SDS suffers significantly if under the section “technical measures” the SDS plainly gives general information, such as “sufficient ventilation required”. Important details are sometimes hidden among items of very general information, or crucial data can only be derived indirectly.

4.1.2. SAFETY DATA SHEETS ARE TOO VOLUMINOUS AND TOO TECHNICAL

Even some experts supported the point raised by many interviewees that safety data sheets are too voluminous and are drafted in too technical a language. But on the other hand most of these users complained that the data in SDS are too vague. Users often view information in SDS just as empty phrases and the data provided as exaggerated. Furthermore, some information appears twice under different sections of the SDS and is therefore redundant. Especially interviewees in Austria pointed out that SDS are too far away from their day-to-day problems.

Some interviewees pointed out they would need expertise in science to understand SDS, since SDS often contain a whole litany of chemical expressions. Many SMEs demanded a reduction in the use of technical language in the SDS.

4.1.3. UNCLEAR STRUCTURE AND OVERLAPPING IN SAFETY DATA SHEETS

Many users complained about finding it difficult to sort out the information they are looking for due to the confusing structure of the Safety Data Sheet. According to the suppliers the main weakness of the current SDS format is the overlap of information between SDS sections, especially between Section 3 and Section 15, and Section 2 and Section 8. It may therefore be concluded that even among the suppliers the differences between the information that should be filled in in these sections were not sufficiently clear.

4.1.4. SAFETY DATA SHEETS ARE IN CONFLICT WITH THE USERS' EXPERIENCE

Some managers in SMEs saw in SDS an instrument of the supplier to shift responsibility to the next person in line. As a consequence, the information and the advice given in SDS is exaggerated, said the companies. One could suppose from the information in them that working with chemical products is always dangerous. However, the experience of the users does not support this conclusion.

In the users' point of view too many products are classified as dangerous. The common sense eye for the actual risks was disappearing, according to many interviewees in SMEs. The experience of the users working with dangerous substances usually results in them not taking information in SDS too seriously.

4.1.5. SDS FOR DANGEROUS AND NON-DANGEROUS PRODUCTS

The users said they frequently had problems getting *all SDS* for the *products* they use. However, several of the SMEs were not aware for which products the suppliers have to provide an SDS according to legal regulations. Some suppliers also submit SDS voluntarily for non-dangerous products, whereas other suppliers do not submit them, a fact that leads to confusion among the users. SMEs simply are often incapable of telling whether a product is legally classified as dangerous or not.

Summary: Main Criticism regarding Safety Data Sheets
• **The information on precautionary measures provided in Safety Data Sheets is said to be generally poor and unspecific**
• **SMEs find Safety Data Sheets too technical, too voluminous, but simultaneously too vague**
• **The information in SDS is ill-structured and some sections contain redundant information**
• **According to SMEs the suppliers do not send SDS for all products they use (however, several SMEs could not discriminate dangerous from non-dangerous products)**

4.2. SUGGESTIONS MADE BY INTERVIEWEES

4.2.1. CONTENTS OF SAFETY DATA SHEETS

Interviewees from SMEs were mainly interested in a better specification of the information in some of the sections of the SDS. They frequently emphasised the need to focus the document strongly on information which is of practical use for small users. Most users are not interested in the legal references given in the SDS, but would prefer

getting more detailed information on precautionary measures. The information provided in SDS should be specific and give examples of how to handle the product and of required precautionary measures. Especially the section concerning the personal protective equipment could be specified better. For example, the SDS should not only state that gloves should be used, but should also indicate the type of gloves to be used.

Some companies expressed their opinion that the safety measures as mentioned in Safety Data Sheets were mainly meant for working with large amounts of chemicals and did not need to be that strict for SMEs only working with much smaller amounts, or working just occasionally with those preparations. These companies would like to see some kind of specification for companies working with smaller amounts of a dangerous preparation.

Suppliers related their suggestions mainly to problems with the indistinctnesses in the EU and in national regulations. Looking at the EU directives it can be seen that with regard to the physical chemical properties and the personal protective equipment, the EU regulation is somewhat vague. For the physical-chemical properties, the person responsible for the compilation of the SDS is obliged to mention those items which he or she thinks are applicable to the product. This may lead to problems for the drafter of which items to list but also to problems for the SMEs, as the completeness of this listing is very variable in practice.

In addition, the EU regulations on SDS may lead to differences in interpretation with respect to information on personal protective equipment. In the EU regulation a variation can be seen for the different types of personal protective equipment. For the protection of the inhalatory tract, it is only necessary to list *whether* adequate protection is necessary while for the protection of the hands, eyes and the skin, a specification of the type of protection is also necessary (e.g. type of gloves).

Most of the experts with the competent authorities were in favour of a more stringent European legislation because they felt that under the present regulations drafters still had too much freedom of choice on which items to highlight in an SDS and which not. Furthermore, some experts were in favour of a European or national database with evaluated data for all substances and preparations; this because of the fact that the quality of the data on the SDS generally is not assured.

4.2.2. SAFETY DATA SHEET LAYOUT

The improvements suggested concerning the lay-out of Safety Data Sheets varied from very small items to rather significant changes in the structure of SDS. Many SMEs stressed the demand for a better textual design and graphic layout of SDS. To improve the visual concept of the Safety Data Sheets SMEs, suppliers, and experts proposed including hazard symbols and indicating the potential hazards either on the first or on the last page of the document. The labelling symbols should be clearly visible on the SDS. Additionally, other pictograms should be applied in an informative way, e.g. indicating when gloves or protective clothing should be used.

Some companies complained about the small letter type some of the drafters used, which made it not very tempting to read the SDS.

Many users and suppliers stated that the lay-out in general could be further standardised and improved, e.g. by imposing a standard lay-out, and a standard order of the SDS sections. However, although the EU does not regulate the order of preference, actually the standard order of the sections is widely used by suppliers in all three countries.

Many interviewees argued for changes in the structure of the SDS. Interviewees mentioned that the order of preference of the various sections could be improved such that the most important sections were mentioned at the beginning. By rearranging the sections in the SDS, their particular prioritisation would change too, which could improve readability and usefulness for non-expert users. The first page should cover information on health hazards, R/S phrases, first aid, and personal protective equipment and by these means the first page of the SDS could serve as an incident document.

Almost all interviewees criticised the length of SDS. According to them, the information could be reduced by leaving out superfluous text or by combining several sections.

4.2.3. COMPREHENSIBILITY OF SAFETY DATA SHEETS

The particular challenge with drafting SDS is to formulate the information most readably, and at the same time in a technically sound way and informatively. All three groups of interviewees gave some suggestions concerning the improvement of the usage and comprehensibility of the SDS.

Most of the companies felt a general need for the improvement of the comprehensibility of the SDS. However, many companies did not state how they would like the SDS to be improved in this respect. Very generally they mentioned simplifying Safety Data Sheets or providing a concise summary in the form of one A4-page which should be in front of the whole SDS. A one-page document should contain a short characterisation of the product, data on essential safety measures, fire precaution and storage information. This suggestion is subscribed to by some of the drafters who also believed that the SDS should be shorter in length and simplified. The spinning out of information rather reduces the value of a document, particularly for users in small companies and for lay people, as one of the suppliers pointed out.

Some interviewees demanded other and additional information sources besides SDS. Clearly illustrated charts for the shopfloor would contribute to improved hazard communication in small companies. For example, some car manufacturers already support their authorised repairers with occupational health, safety and environmental operation instructions. Some interviewees were in favour of supplier-prefabricated operation instructions and easy-to-use information on actions to be taken in case of incidents. The owner of a car repair shop stated that occupational health & safety information should be integrated in the workshop information systems of the automobile companies. Further, some SMEs suggested that their sector organisations and bipartite

occupational health & safety insurance scheme could play a more active role in providing support on how to read and interpret a Safety Data Sheet. This might make the current system more effective as occupational health and safety problems are assumed to be quite similar in particular sectors working with particular chemical products.

Some interviewees with authorities highlighted the need to develop more comprehensible phrases for some SDS sections, i.e. concerning occupational health, safety and environmental issues and information on technical, organisational, and personal precautionary and protection measures.

4.2.4. DISTRIBUTION OF SAFETY DATA SHEETS

Some suggestions were made concerning the distribution of the SDS. These suggestions dealt with the distribution of the SDS by electronic means such as diskettes or the Internet, instead of the pile of papers companies using dangerous products now receive. Some interviewees explicitly expressed the demand for an IT-based access to electronic SDS-databases. Some interviewees were in favour of a large database of SDS which would be available to all companies by means of the Internet.

The experts with the authorities demanded that suppliers should in particular pay attention to motivating the users of dangerous substances to improve health, safety and environmental communication in the companies. Suppliers providing information-services for proper handling of dangerous materials, and providing SDS automatically with every delivery of a product contribute to achieving this aim. Improved communication between suppliers and users positively influences the users' perception of the quality of the service provided by the suppliers and simultaneously puts attention to dangerous substances in the workplace.

4.2.5. ENFORCEMENT OF SAFETY DATA SHEET REGULATIONS AND OTHER POLICY ACTIONS

The experts from the competent authorities further supported stronger enforcement activities to reduce flaws in SDS and mismanagement of SDS-drafting among suppliers. Measures comprise more pro-active inspection activities, and action against wrong and misleading citation of legal references and requirements in SDS.

Experts with authorities criticised the fact that the legislation with respect to the SDS were set up with the large companies in mind. These companies were also partners during the negotiations in the EC. SMEs however, were not involved in these negotiations. Hence, experts expressed the need to improve the say of users in small companies in the political debate on the further development of legislation on chemical products.

Experts strongly supported the suggestion to enlarge the scope of SDS to some non-dangerous classified chemical products. The interviewees with the competent authorities

were backing the ongoing negotiations on the European level to make SDS for some groups of preparations not classified as dangerous compulsory from 2002 onwards.

Experts from the authorities emphasised that small producers of dangerous products lack sufficient access to information sources which is needed to draft SDS properly. The interviewees suggested setting up an information-network for small chemicals manufacturing companies. Another measure suggested by experts referred to developing a drafter's manual for SDS-suppliers and setting up a Code of Good Practice for drafters of Safety Data Sheets.

Summary: Suggestions of Interviewees

- **SMEs, suppliers, and some experts with authorities propose improving the lay-out of Safety Data Sheets by means of graphic symbols, pictograms or colour codes**
- **SMEs, and many experts, suggest paying more attention to practical measures in Safety Data Sheets, such as information on personal protective equipment**
- **Many SMEs suggest a shorter format of Safety Data Sheets, or an additional one-page document**
- **Authorities suggest more detailed European regulation on how SDS have to be drafted and what data it is compulsory to provide**
- **Authorities stress that the quality of drafting SDS has to be further improved**
- **Authorities emphasise the need to make SDS for distinct groups of non-dangerous preparations compulsory**

5. DISCUSSION

Since the first drafting of a Safety Data Sheet[6] many details of this information tool have changed, but some basics have remained. First of all, Safety Data Sheets serve several purposes. They are an instrument of occupational health & safety policy but likewise important for environmental management, transport regulation, incident prevention and other legal requirements imposed on firms using dangerous substances and preparations. In addition, SDS are meant to motivate companies to plan and realise occupational health, safety and environmental measures, such as searching for substitutes for dangerous preparations. SDS are addressed to different groups of people inside and outside the companies. The different requirements of each group of SDS users lead to an SDS format which is supposed to meet the particular needs of all users, not only those of one specific group.

5.1. WHY DO SMALL COMPANIES NOT USE SAFETY DATA SHEETS?

The findings in the interviews showed clearly that SDS have only little relevance in small companies. Practical consequences of using SDS were hardly reported. The interviewees gave in particular the following reasons for not using Safety Data Sheets:

- Safety Data Sheets are a legal requirement but do not have any influence on the working procedures or practical consequences for the design of the working environment. So, besides filing them, why bother with SDS at all?
- Companies and workers are experienced and familiar with how to handle dangerous products, and the products have already been in use for a long time, or the total amount of dangerous substances is small and poses no risks to the workers or to the environment.
- Risks arising from chemical products can be ruled out. The company exclusively uses products that pose no risks for the health of the workers and for the environment. Examples of products interviewees considered to be used without potential risks: water-based lacquers in metal-shops, and materials *"meeting the highest standards concerning human tolerability"* in dental laboratories, as one interviewee put it.

Product labels and technical instructions on how to handle products are more frequently used as a source of health, safety and environmental information than SDS. The companies see in the information given on the label of dangerous products the really crucial data. Information concerning environmental issues, e.g. waste classification numbers, are rather gathered from other documents (e.g. invoice of the delivery note), or the information needed is obtained by inquiring at the supplier.

6 According to Kaplan (no year), Valentine and Company issued the first SDS in the year 1906 in the USA, apart from similar written documents found in the tombs of the Egyptians, which date back 4,000 years.

The findings in the interviews provide evidence of the following shortcomings with respect to Safety Data Sheets in small companies:

- SMEs often lack knowledge about the concept and the aims of SDS, and / or their knowledge about the content of SDS is insufficient.
- SMEs do not manage the request, filing, and use of SDS adequately.
- SMEs may recognise the value of SDS in pursuit of a safer working environment, but they may not draw upon practical advantages from SDS due to a lack of qualification in reading and understanding SDS information.
- SMEs do not recognise the value of SDS for daily business practice. It actually remains unclear to SMEs how SDS can be sensibly used for improving line- and staff management procedures in order to achieve a better occupational health, safety and environmental performance.

Some small companies still lack information about legal regulations on SDS-requirements. Several of the SMEs interviewed did not know which products they worked with actually were dangerous. Neither do many SMEs regularly check whether all SDS for dangerous products are available in the company. It became evident that small companies cannot cope with checking the correctness of the data provided. Measures aimed at suppliers that ensure SDS are correct when sent to small users are therefore crucial.

The findings of this project on how SMEs use and judge the usefulness of SDS are in accord with results presented in the literature. According to a German study only a quarter of them use SDS as an information source (Voullaire and Kliemt, 1995:37ff): Even a well-conceived and well-written SDS is for many users just an abstract piece of information. The SDS does not automatically lead to practical hazard information in the workplace and proactive health and safety activities in the company. However, lack of practical action is one of the main shortcomings in occupational health, safety and environmental management in SMEs.

A recent study in the United States on the effects of the implementation of the OSHA Hazard Communication Regulations draws a more positive picture (US GAO 1992). The majority of the interviewees in very small enterprises reported fewer difficulties and less costs with the implementation of the requirements related to SDS compared to interviewees in bigger companies. However, according to this study, small companies do have difficulties, especially with the requirements on qualification of the employees working with dangerous substances.

5.2. FACTORS INFLUENCING THE USE OF SAFETY DATA SHEETS

In the past, authorities and research focused mainly on three distinct characteristics of SDS: accuracy, completeness and currentness (Wang and Hong, 1997). Recently concerns about the readability of SDS have been voiced. Increasingly, both policy makers and companies realise the importance of SDS being not just complete and correct, but clearly written and well-formatted to improve readability and the acceptance of the SDS by the users.

The findings of recent research conducted in different countries showed clearly that there are still shortcomings in the correctness and completeness of SDS (Lerman and Kipen, 1990; Kolp et.al., 1995; Paul and Kurtz, 1994; Karpinski, 1994; Côté et.al., 1998; Holmes et.al., 1993; Winder and Ng, 1995; Schultz, 1997; Schnierle, 1997; Umweltbundesamt, 1998; Kanerva et.al., 1997; Henriks-Ekerman and Kanerva, 1997; Kaup and Pohl, 1999). It has to be born in mind that these studies partly assessed different types of SDS-formats such as the former DIN-SDS format or the ANSI Z400.1-Standard of 1993 in the United States.

The drafters of SDS can find many information sources, including databanks on SDS, on the Internet[7]. Thousands of standardised phrases used in SDS have been translated into all EC languages (Schnierle, 1997:253) and many guidelines for drafting SDS have been produced. However, this information does not necessarily support small producers of dangerous preparations. According to a recent American report (NACOSH, 1996) many incomplete or inaccurate SDS are drafted by small companies. The reasons for this situation can be seen in a lack of qualification of small drafters in how to select and interpret information, and in the technical language which is deployed in many manuals.

Further, Côté et.al. (1997) reported methodological problems with the evaluation of toxicological data to determine the correct classification of dangerous chemicals. Ambiguities may occur due to national specifics with regard to the classification of chemical preparations. Ignatowski et.al. (1995) reported such cases if SDS drafted in the United States or Canada are “translated” into the EU format.

The findings in this study do match the results of previous work on the comprehensibility of SDS for non-expert users in SMEs. Kolp et.al. (1993) showed for the United States that SMEs require clearly described and practically applicable information in SDS. SDS are often found to be too long and too complex. The core information is often difficult to find in the entanglement of very technical information (NACOSH, 1996). In a German study, users in SMEs were reported to complain about the incomprehensibility of the technical language and unclear abbreviations used in SDS (Voullaire and Kliemt, 1995:39f).

7 Wang and Hong (1997) assessed the quality of SDS provided on the Internet.

Although, according to the judgement of the experts interviewed in this research the quality in terms of accuracy and completeness of SDS has been increasing in recent years, many problems on the comprehensibility of the information remain unsolved.

The findings of this study show clearly the deficiencies in the communication between drafters and users in SMEs. SMEs very often complained that they did not receive the SDS automatically. Many SMEs do not check regularly whether all SDS for dangerous products are available in the company. They face difficulties in telling whether an SDS is up-to-date or not, as Voullaire and Kliemt (1995:46) pointed out. More attention should therefore be paid to ensuring that suppliers sending correct and complete SDS to SMEs.

Based on the evidence of the interviews and results from other studies very briefly mentioned above, the following factors can positively influence the availability and the use of Safety Data Sheets:

- The size of the company: Bigger business establishments are more likely to have access to health, safety and environmental professionals, either in-house or through an external occupational health & safety service. Companies with OHS-experts tend to pay more attention to occupational health and safety issues related to dangerous preparations in the company than companies lacking supporting experts.
- An obligation to assess the potential risks in the workplace, and to plan and implement measures based on this risk assessment positively influences the circulation and use of SDS in SMEs.
- Quality management systems (ISO 9000 / 14000, EMAS) implemented in companies generally increase the availability (and the use) of SDS.
- SMEs closely linked to large firms or multinational corporations (subsidiaries, strong supplier-customer relationship), tend to have a higher awareness of occupational health, safety and environmental problems.

5.3. CONSEQUENCES FOR SDS-POLICY

The SDS is a multi-purpose instrument and provides different groups of users with hazard information on dangerous substances and preparations. Taking into account the wide range of potential users, SDS cannot be designed and drafted only for the needs of lay persons or non-expert users in small companies. SDS must provide extensive and full information for the needs of expert users, too. On the other hand, dividing the SDS in two documents, one for lay-people and one for experts, is not an appropriate means for improving the current situation. A variety of different SDS, according to the specific purposes, does not seem practicable nor does this necessarily contribute to promoting health, safety, and environmental communication.[8]

8 The report of the NACOSH (1996) addressed particularly the proposal of different formats for different users and different circumstances. The committee drafting the NACOSH report for example rejected ideas of a small quantities exemption for users of small amounts of chemicals or special formats of SDS for SMEs on the grounds of that these proposals would in fact create more work for small businesses rather than less, taking

One possibility to deal with this problem is to require an additional one to two page document from the suppliers. This document should be designed specifically for users seeking practical information on potential hazards and how to use the product. The available experience with GISBAU in Germany and with PISA in the Netherlands supports the idea of an additional document. The political, economic, and practical feasibility of such an additional instrument for hazard communication should at least be further explored.

The concept and the layout of Safety Data Sheets can – and should – be further improved, indeed. Possible measures comprise for example, making SDS by means of hazard signs and pictograms visually more attractive, and reducing the confusion of users for which products they actually should be supplied with SDS. Providing sufficient practical information and examples as text-blocks, particularly on preventive measures, or introducing standard phrases which are easier to comprehend, can contribute to an increased user-friendliness of Safety Data Sheets.[9]

Further measures to be considered may include increased checking activities of the competent authorities in companies to ensure legal compliance with the current SDS regulations.[10] The authorities, the sector organisations of SMEs and the chemical industry must pursue creating a supportive framework for the use of SDS in SMEs, e.g. through better expert support and database access for suppliers and users of dangerous substances, as well as through qualification and improved information tools. There is a clear need for paying more attention to improving the hazard communication system in SMEs.

Whilst in recent years the quality of SDS has gradually improved, too little attention has been paid to improving communication between suppliers and users. The first thing to mention is the reluctance of some suppliers to deliver SDS automatically. One supplier excused himself for not sending SDS by stating that SDS were not used on the shopfloor, anyhow. A „culture" of demanding SDS has to be encouraged on the users' side, too. Actions aimed at fostering communication between users and suppliers should be given high priority in further policy making.

into account the assessment and documentation work necessary to determine whether such regualtions actually apply.

9 See also NACOSH (1996)

10 Suggestions for further action in this area was described in the final report of the European SENSE project (VROM, 1998).

6. RECOMMENDATIONS

Based on the evaluation of the interviews described in Chapter 3 and Chapter 4 and the conclusions drawn from the evaluation of the interviews (Chapter 5) we recommend the following actions to be considered for the improvement of the Safety Data Sheet. In the course of the interviews conducted in this project, frequently users in small companies, but also drafters and experts from the authorities, emphasised the unsatisfactory graphic lay-out of safety data sheets, which makes it difficult for inexperienced users to find the information sought. Using the pictograms from the product label and other safety signs as laid down in Directive 92/58/EEC could significantly contribute to a better readability and understanding of the information for users in small companies.

Recommendation 1: Make use of Safety Signs in Safety Data Sheet compulsory
The compilation of Safety Data Sheets should contain safety signs (Directive 92/58/EEC) in line with the labelling information required for the respective preparation in compliance with European and national regulations.

Clear and practically applicable phrases – not only referring to R- and S-phrases, but also to other parts of the SDS – could increase the quality of the information in SDS, provided that the phrases are well-conceived and correctly applied to the preparations. In all three countries covered in this study, users in SMEs and experts with competent authorities referred to the generally poor quality of the information given under recommended precautionary measures and unspecific data on personal protective equipment. There is a need to specify the requirements for the compilation of Safety Data Sheets in more detail. Improvements of SDS should aim at providing more practical information about the necessary health and safety measures to be taken for the safe handling of dangerous products. The information provided should give priority to occupational health and safety measures (technical, organisational and personal measures) in line with the EU Framework Directive on Health and Safety at Work and the respective national legislation. If appropriate, measures to be taken ought to be classified according to the main application techniques of the product (e.g. for paints: discrimination of measures to be taken for spraying and rolling). We recommend:

Recommendation 2: Specify Requirements on the Compilation of SDS
The EU Directive on SDS and the national regulations should be amended aiming at specifying the requirements for drafting SDS with respect to the quality and significance of the information provided. Clear guidelines on how to draft practical preventive measures on technical, organisational and personal levels should be given.

With the implementation of the Directive on Safety Data Sheets in the member states of the European Union, the extent and the quality of information compiled in Safety Data Sheets have undoubtedly improved in a significant way. Insofar, the European Directive is a great success of European legislation on industrial chemicals and hazard communication.

However, from the interviews, especially from those conducted in Austria and the Netherlands, it became clear that one of the reasons that SDS currently are ill-suited to the needs of SMEs can be seen in the fact that small companies were barely involved in the negotiations about SDS regulations. Although it might be difficult to develop a system that ensures the participation and involvement of SMEs in the decision making process on an EU-level, a regular feed-back to SMEs during such negotiations on a national level is indeed desirable.

Recommendation 3: Involve SMEs in Future Advancements of SDS
The competent authorities should ensure that users in SMEs are represented in working groups and advisory bodies engaged in the further development of Safety Data Sheets and other instruments of hazard communication in companies

Many commercially used chemical preparations are not labelled as dangerous, although the products may contain dangerous substances and may pose risks for the users. Examples for product groups which are frequently not labelled as dangerous are water-based lacquer, industrial cutting fluids and other coolants.

Many users in small companies reported having serious problems telling whether or not a product is dangerous according to European and national regulations. In pursuit of a good management of dangerous chemicals in small companies, the availability of SDS for all products used there seems to be beneficial. Currently, some suppliers issue Safety Data Sheets just for their dangerous products (in line with European legislation), other suppliers provide Safety Data Sheets for all products, regardless of whether labelled dangerous or not. As a consequence users are often confused as to whether they have actually got all SDS they should get from their suppliers. This is not a desirable situation.

We recommend broadening the requirements to supply Safety Data Sheets also for chemical preparations not labelled as dangerous, but containing dangerous substances above a certain threshold level. This recommendation is in line with proposals for an amendment of the EU-directive on dangerous preparations aiming at making the statement of the perceptual content of dangerous substances in SDS compulsory. The proposals currently being discussed would oblige suppliers to provide data concerning the composition of all dangerous substances above a threshold level of 1 weight-%, irrespective of the product classification.

For chemical preparations which do not contain any dangerous compounds above the threshold level we recommend encouraging suppliers to issue a statement indicating that the preparation does not contain any dangerous substance above the threshold as laid down in European and national regulations.

Safety Data Sheets for distinct groups of non-dangerous products would place SMEs in a position to check by simple means whether health, safety and environmental information is available for all products used in the company, and would make it easier for small companies to discriminate between dangerous and not dangerous classified products.

If an SDS is provided for a non-dangerous product it should be clearly visible from the document. The reader of an SDS should always be able to tell from the first page whether the product contains dangerous substances and what the dangerous properties of the products are (dangerous substance classification).[11]

Recommendation 4: Safety Data Sheets for distinct groups of preparations not labelled as dangerous and a clear statement on the first page of SDS whether the preparation contains dangerous substances
The supplying of Safety Data Sheets should be made obligatory for chemical preparations not labelled dangerous but containing dangerous substances above a certain threshold level **On every first page of a Safety Data Sheet issued by a supplier it should be clearly stated whether or not the preparation actually contains dangerous substances** **Suppliers should be encouraged to issue a statement for all non dangerous products informing the users that the products do not contain dangerous substances above a certain threshold level and that no SDS has to be issued in accordance with current legislation**

Safety Data Sheets can be provided electronically either on-line or by means of a data-storage medium, i.e. diskette or CD-ROM. If SDS are available online via the Internet or as information contained on a CD-ROM / diskette the information can be accessed more easily from different locations in a company. Software systems can help to develop “electronic routines” which support users drawing up a dangerous product inventory or to keep track of the VOC balance in the company.

However, some infrastructural and technical issues have to be addressed in order that electronic access to and delivery of SDS can be a success. A pre-requisite of an electronic SDS access and delivery system is that all potential users can easily read the

11 The US-report of the NACOSH (1996) likewise recommended a compulsory statement on the SDS indicating whether the preparation is classified as dangerous or not.

electronic format of the data. Simultaneously, the system has to ensure that data transmission does not lead to a loss of graphic information, especially since the use of graphic elements, signs and icons should be encouraged in the future. We recommend:

Recommendation 5: Develop Models for Electronic Access and Delivery of SDS
The competent authorities and the sector organisations of suppliers and users of dangerous preparations should develop models which allow electronic access, delivery, and use of Safety Data Sheets in SMEs.

Besides improvements in concept, design and access to Safety Data Sheets, measures to increase compliance and effectiveness of SDS regulations should be taken. The competent authorities should set up action programmes, including information activities and effective inspections to check the compliance of suppliers with SDS-drafting regulations. Information and inspections should aim at supporting the supplier's performance in providing superior and accurate information in Safety Data Sheets in accordance with the legal regulations as laid down in European Directives and national legislation.[12]

Recommendation 6: Improving enforcement of Safety Data Sheet regulations
The competent authorities in the member states of the European Union should develop action programmes and improved inspection activities to check the compliance of suppliers of dangerous preparations with European and national SDS regulations.

Whilst the quality of SDS has gradually improved in recent years, too little attention has been paid to encouraging communication between suppliers, users, sector organisations, and the competent authorities, and to improving effective hazard communication inside small companies in general.

Small companies still have difficulties on how to integrate Safety Data Sheets into their general occupational, health and safety policy. The competent authorities, in co-operation with suppliers and sector organisations, can support SMEs by means of providing sector specific practical guides on how to implement hazard communication about dangerous substances effectively in a small company. These guides should contain easy to understand information for which purposes, and how, an SDS can be used in a small company. The topics raised in the sector specific guides should relate to the legal responsibilities of companies with respect to environmental and occupational health & safety legislation, e.g. waste disposal, immission and emission thresholds,

12 Referring to the findings in the SENSE project, a balance has to be found between "quick and dirty" and "in-depth" checks of the competent authorities.

dangerous product inventory, risk evaluation, etc. Further information should be provided on how to create operating instructions, on additional information sources available, and information on external support. Practical examples and non-technical language are considered crucial for the success of such publications. The sector specific hazard communication guides could be made available not only as hard copy but also be placed on the Internet.

Recommendation 7: Promoting Hazard Communication: The Small Users' Hazard Communication Guide
The competent authorities and the sector organisations of suppliers and users of dangerous chemicals should develop (sector specific) Hazard Communication Guides for SMEs. These guides should aim at integrating SDS into a broader hazard communication and management approach.

There is a great need to foster general awareness and know-how towards occupational health, safety and environmental management in SMEs. Vocational training and education is a key element to achieving this objective. We do not believe that training that is narrowly focused on the *contents* of Safety Data Sheets can significantly improve their use in SMEs. But we do believe integrated training approaches in occupational health, safety and environmental management, of which hazard communication is an important part, can significantly contribute to deploying the available instruments in SMEs in a better way. Access to new media (e.g. via the Internet) can play an important role in supporting continuous education and training activities.

The competent authorities in the member states, umbrella organisations of suppliers of chemical preparations and the sector organisations of the users should work together to develop training, education and information measures aimed at qualifying users in SMEs for a safer handling of dangerous preparations in small businesses well-adjusted to the national occupational health and safety framework.

Recommendation 8: Measures Aimed at Qualifying Users in SMEs
The competent authorities, the social partners, sector organisations and vocational training institutions in the member states of the European union should set up training and information activities on preventive health & safety management in small companies.

The translation of the information provided in SDS into a more readily comprehensible and more easily usable short document was mentioned by many interviewees in this research. The positive experience with instruments such as GISBAU in Germany or PISA in the Netherlands support the argument that there is a need for an additional, concise and specific hazard communication tool. Developing such a tool and making it compulsory in the European Union should at least be considered and further investigated.

Irrespective of the development of a compulsory additional document in the future, the authorities and the sector organisations should encourage and stimulate SMEs to draft such work instruction sheets either themselves or with the help of sector organisations, occupational health and safety services, or the bipartite occupational health & safety insurance schemes.[13]

Recommendation 9: Stimulate Drafting of Workplace Instructions
The competent authorities, the social partners, and the sector organisations should develop action to stimulate the translation of SDS information into short and easy to understand workplace instructions **The competent authorities should consider making workplace instructions (in the form of a one or two page document) derived from SDS information compulsory for users of dangerous substances**

13 In Germany this “translation“ of SDS information is already compulsory. The technical guideline TRGS 555 specifies the obligations for drafting “Betriebsanweisungen“ (workplace instructions for dangerous preparations).

7. REFERENCES AND BIBLIOGRAPHY

ALLESCHER, Werner: Informationstransfer im Gefahrstoffbereich. In: Gefahrstoffe - Reinhaltung der Luft 57, Nr.6 (1997), S.236-238.

BECKER, William J., STEPHENSON, William C.: Hazard Communications. OSHA-Standard 1910.1200. IFCS-Information Document - 2, 30. 1. 1997 (Forum II, 2th Session of the Intergovernmental Forum on Chemical Safety, Ottawa, Canada).

BENNETT, David: Chemical Classification. Endangering the Right-to-Know. In: New Solutions. Summer 1997, pp.74-79.

BERATUNGS- UND INFORMATIONSSTELLE ARBEIT & GESUNDHEIT (Hg.): Sicherheitsdatenblätter - (k)ein Problem? In: Informationen zu Arbeit & Gesundheit, Nr.3, Hamburg, Januar 1996.

BERGER, Dirk, WEISSERT, Robert: Umsetzung der Gefahrstoffverordnung. Deutscher Gefahrstoffschutzpreis 1996 für die Volkswagen AG. In: Die BG, Mai 1997, S.248-251.

BERUFSGENOSSENSCHAFT CHEMIE (Hg.): Gefahrstoffe beherrschen - Teil 1. Neue Anforderungen an das Sicherheitsdatenblatt - Informationsbedarf bei kleinen und mittleren Betrieben. In: Sichere Chemiearbeit, Nr. 5, Mai 1996, S.52-53.

BERUFSGENOSSENSCHAFT CHEMIE (Hg.): Gefahrstoffe beherrschen - Teil 2. Neue Anforderungen an das Sicherheitsdatenblatt. In: Sichere Chemiearbeit, Nr. 6, Juni 1996, S. 64-65.

BLUFF, E. J.: The use and management of hazardous chemicals in south Australian workplaces. In: Safety Science 25, No.1-3 (1997), pp.123-136.

BMAS (Deutschland, Hg.): TRGS 220: Sicherheitsdatenblatt für gefährliche Stoffe und Zubereitungen. Stand 9/1993. BarbBl Nr.9/1993, S.36ff.

BMAS (Deutschland, Hg.):TRGS 555: Betriebsanweisung und Unterweisung nach § 20 GefStoffV. BarbBl Nr.3, 1989, S.62ff.

BMUJF (Österreich, Hg.): Chemikaliengesetz (ChemG 1996). Bundesgesetz über den Schutz des Menschen und der Umwelt vor Chemikalien. BGBl1997/53 idF BGBl I 1997/112.

BMUJF (Österreich, Hg.): Chemikalienverordnung (ChemVO). Verordnung über die Einstufung, Verpackung und Kennzeichnung von gefährlichen Stoffen und Zubereitungen. BGBl 1989/208 idgF.

BMUJF (Österreich, Hg.): Novellierung der Chemikalienverordnung (ChemVO) in Begutachtung. Stand 11/1998.

CAMPBELL, S. L.: A New Look for the MSDS. In: Occupational Health & Safety 61 (1992), No. 6, pp.62-67.

CCOHS (Canadian Centre for Occupational Health & Safety, ed.): Creating Material Safety Data Sheets. [online] Available: http://www.ccohs.ca/oshanswers/legisl/ msds_prep.html. Accessed May 28, 1998 (Last Update May 7, 1998).

CCOHS (Canadian Centre for Occupational Health & Safety, ed.): Material Safety Data Sheets. [online] Available: http://www.ccohs.ca/oshanswers/legisl/ msdss.html. Accessed May 28, 1998 (Last Update Jan 12, 1998).

CHERNIAK, Michael J.: Training Tips: SDS Forms - Give necessary Information only If Users know how to interpret them. In: Occ. Health a. Safety 61, No.10 (1992), pp.78-81.

CÔTÉ; Rosanne, DAVIS, Hugh, DIMOCK, Colleen, KORPAN, Mary, LOEWEN Ken, SEGAL, Lawrence M.: The Evaluation and Hazard Classification of Toxicological Information for Workplace Hazardous Materials Information System – Material Safety Data Sheets. In: Regulatory Toxicology and Pharmacology 27 (1998), pp.61-74.

CROSS, Lisa: Dial-Up Service Eases Compliance - Now printers can get immediate, fax-back access to appropriate material safety data sheets (SDS forms). In: Graphic arts monthly 67, No.1 (1995), pp.73-75.

EUROPÄISCHE KOMMISSION (Hg.): First Safety Data Sheet Directive - Richtlinie der Kommission vom 5. März 1991 zur Festlegung der Einzelheiten eines besonderen Informationssystems für gefährliche Zubereitungen gemäß Artikel 10 der Richtlinie 88/379/EWG des Rates (91/155/EWG). Abl Nr. L76 vom 22. 3. 1991, S.35-41.

EUROPÄISCHE KOMMISSION (Hg.): SDS Amending Directive – Novellierung 93/112/EG der Richtlinie 91/155/EWG. Abl Nr. L314 vom 16. 12. 1993.

HADDEN, S. G.: Providing Citizens with Information about Health Effects of Hazardous Chemicals. In: J. of Occ. Medicine, 31, No.6 (1989), pp.528-534.

HAIN, Brigitte, BÖCKER, Heinrich: Das Sicherheitsdatenblatt – kein Buch mit sieben Siegeln. Teil 2. In: Die BG, Nr. 7, Juli 1990, S.390-393.

HEIKKILÄ, Pirjo: International Chemical Safety Cards. In: Newslett. In: African Occup. Health and Safety 8 (1998), pp.14-15.

HELMRICH, David M.: Managing the SDS Mess. In: Occ. Health and Safety 65, No.3 (1996), pp.47-50.

HENRIKS-ECKERMAN, M.-L., KANERVA, L.: Product analysis of acrylic resins compared to information given in material safety data sheets. In: Contact dermatitis: Env. and Occ. Dermatitis 36, No.3 (1997), pp.164-165.

HOCHHAUSER, Mark: Why Aren't Material Safety Data Sheets More Effective? In: Occ. Health and Safety 66, No.8 (1997), pp.58-65.

HOLMES, Noni, PEARCE, Peter, SIMPSON, Gary: Prevention of Epoxy Resin Dermatitis: Failure of Manufacturers to Use Available Research Information. In: Amer. J. of Ind. Medicine 24, No.5 (1993), pp.605-617.

HSE (ed.):Why do I need a safety data sheet? [online] Available: http://www.open.gov.uk /hse/pubns/chipsds.htm. Accessed May 29, 1998 (Last Update September 9, 1997).

HSE (ed.): Safety data sheets for substances and preparations dangerous for supply. Approved Code of Practice. L37 (1993).

IG METALL (Bezirksleitung Stuttgart, Hg.): Sicherheitsdatenblätter – leichter verstanden". Stuttgart (1994).

IGNATOWSKI, A. J., WEILER, E. D.: Review of International Criteria and Mixture Rules for Hazard Classification. In: Regulatory Toxicology and Pharmacology 22 (1998), pp.231-242.

IGNATOWSKI, A. J., WEILER, E. D.: Managing Material Safety Data Sheets world-wide. In: Amer. Ind. Hygiene Assoc. J. 56 (1995), pp.698-705.

IGNATOWSKI, A. J., ROSENTHAL, I.: The Operational Material Safety Data Sheet - Key to the Effectiveness of a Generic Approach to the Control of Health and Safety Risks: II The Operational Material Safety Data Sheet. In: Applied Occ. and Env. Hygiene 8, No.8 (1993), pp.714-720.

IOMC (Interorganization Programme on Sound Management of Chemicals, Coordinating Group for the Harmonization of Chemical Classification Systems, ed.): Revised Terms of Reference and Work Programme. IOMC/HCS/95, 14. 1. 1996.

ISO-Norm 11 01 4-1. Sicherheitsdatenblatt für chemische Stoffe und Zubereitungen. First Edition 15. 3. 1994.

KANERVA, Lasse, HENRIKS-ECKERMAN, Maj-Len, JOLANKI, Riitta, ESTLANDER, Tuula: Plastics-Acrylics: Material Safety Data Sheets Need to Be Improved. In: Clinics in Dermatology 15, No.4 (1997), pp.533-546.

KAPLAN, Samuel A.: Development of Material Safety Data Sheets. Paper, presented at the 191th ACS National Meeting, New York (no year).

KARPINSKI, E.: The Evaluation of Selected Information Disclosed on Material Safety Data Sheets (SDS). Human Ressources Development Canada, Occ. Safety and Health Branch, report December 1994.

KAUP, U., POHL, M.: Erfahrungen mit dem Sicherheitsdatenblatt als Informationsquelle. In: Der Sicherheitsingenieur (1999), pp.18-21, 38-40.

KITTEL, G., ELSIGAN, G., KUMMERER, S., GEYER, A.: Gefahrstoff- und Sicherheitsmanagement in Europa. AUVA report Nr.10 (1996), 126S. + Anh.

KOLP, Paul, SATTLER, Barbara, BLAYNEY, Michael, SHERWOOD, Timothy.: Comprehensibility of Material Safety Data Sheets. In: Amer. J. of Ind. Medicine 23, No.1 (1993), pp.135-141.

KOLP, Paul W., WILLIAMS, Phillip L., BURTAN, Rupert C.: Assessment of the Accuracy of Material Safety Data Sheets. In: Amer. Ind. Hygiene Assoc. J. 56, No.2 (1995), pp.178-183.

LEHTO, M. R.: The influence of chemical warning label content and format on information retrieval speed and accuracy. In: J. of Safety Research 29, No.1 (1998), pp.43-56.

LERMAN, S., KIPEN, H.: Material Safety Data Sheets. In: Arch. Internal Med. 150 (1990), pp.981-984.

MICHAELS, David, ZOLOTH, Stephen, KASS, Daniel, SCHRIER, Katherine: Workshops are not enough: Making Right-to-Know Training Lead to Workplace Change. In: Amer. J. of Ind. Medicine 22, No.11 (1992), pp.637-649.

MILLER, Hobart G.: Consistent, Accurate Data Needed for Preparing the MSDS. In: Occupational Health & Safety 55 (1986), No. 4, pp.31-34.

MÜLLER, N.: Sicherheitsdatenblatt und Lagerung gefährlicher Stoffe. In: Sicherheitsingenieur 28, Nr.9 (1997), S.26-29.

NACOSH (National Advisory Committee on Occupational Safety and Health) (ed.): Report of the Hazard Communication Workgroup to the National Advisory Committee on Occupational Safety and Health (NACOSH). Washington, September 1996.

NATIONAL CHEMICALS INSPECTORATE (ed.): Regulations on Safety Data Sheets, by authority of Sect. 11 of the Chemical Products Ordinance (1985:835). KIFS 1994:13.

NATIONAL CHEMICALS INSPECTORATE (ed.): Regulations on Safety Data Sheets: General Recommendations 1994:2.

N. N.: Leitfaden für die Benutzung von Sicherheitsdatenblättern. In: SÖFW. Seifen, Öle, Fette, Wachse 124, Nr.1 (1998), S.45.

N.N.: OSHA to develop global hazard communication standard. In: Process Safety Progress 16, No.3 (1997), p.F4.

N. N.: Gefahrstoffe beherrschen. Neue Anforderungen an Sicherheitsdatenblatt. In: Sichere Chemiearbeit 48, Nr.5 (1996), S.52-53 (Teil I) und Nr.6 (1996), S.64-65 (Teil II).

ÖNI (Österreichisches Normungsinstitut, Hg.): ÖNORM Z 1008. Sicherheitsdatenblatt für chemische Stoffe und Zubereitungen. Wien, Ausgabedatum 1. 1 1991.

OSHA (U.S. Dept. of Labour, Occupational Safety and Health Administration, ed.): Chemical Hazards Communication. OSHA 3084 (1995), 21p.

OSHA (ed.): Bureau of Oceans and International Environmental and Scientific Affairs. International Harmonization of Chemical Safety and Health Information. Federal Register #: 62:15951-15957 [online] Available: http://www.osha-slc.gov.80/FedReg_osha_data/FED19970403.html Accessed September 22, 1998 (Information Date Mar 4, 1997).

PAUL, Maureen, KURTZ, Sabrina: Analysis of Reproductive Health Hazard Information on Material Safety Data Sheets for Lead and the Ethylene Glycol Ethers. In: Amer. J. of Ind. Medicine 25, No.3 (1994), pp.403-415.

RITZEL, Dale O.: Voyage on the Internet. Uncover New Information on Material Safety Data Sheets. In: Safety & Health 154, No.5 (1996), pp.111-112.

ROSENTHAL, I., IGNATOWSKI, A. J.: The Operational Material Safety Data Sheet - Key to the Effectiveness of a Generic Approach to the Control of Health and Safety Risks: I. An Approach to Managing Risks for Nonspecifically Regulated Substances. In: Applied Occ. and Env. Hygiene 8, No.8 (1993), pp.708-713.

ROTH, Lutz: Sicherheitsdatenblätter: Erstellung und Kontrolle mit Beispielen und Diskette. Weinheim (1992).

SAARI, Jorma, BÉDARD Sylvie, DUFORT, Vincent, HRYNIEWIECKI, Jan. THÉRIAULT, Gilles: Successful Training Strategies to Implement a Workplace Hazardous Materials Information System. An Evaluation Study at 80 Plants. In: J. of Occ. Medicine 36, No.5 (1994), pp.569-574.

SCHNIERLE, Helmut: Möglichkeiten der Hilfestellung für Betriebe durch Betriebsanweisungen und Sicherheitsdatenblätter. Gefahrstoffe: Reinhaltung der Luft. 57, Nr.6 (1997), S.253.

SCHULTZ, Hedda: Elektronische Sicherheitsdatenblätter. In: Nachr. Chem. Tech. Lab. 45, Nr.5 (1997a), S.500-502.

SCHULTZ, Hedda: Informationsquelle Sicherheitsdatenblatt. In: Sicherheit + Management, Nr.3 (1997b), S.170-173.

STEPHAN, Constantin: Informationsträger Sicherheitsdatenblatt. In: Nachr. Chem. Techn. Lab. 44, Nr.11 (1996), S.1080-1082.

TOMSCHIK, Erwin: Korrekturen zur WIFI-Broschüre “Leitfaden zum Ausfüllen eines Sicherheitsdatenblattes”. Stand 1. Jänner 1998. Wien, April (1998), 1S.

UMWELTBUNDESAMT (Hg.): SENSE: Europäisches Projekt zur Kontrolle der chemikalienrechtlichen Bestimmungen von auf dem Markt befindlichen Chemikalien. Österreichbeilage: Zusammenfassung des Projektes und Auswertung der österreichischen Ergebnisse. Wien, Jänner (1998), 6S.

U.S. General Accounting Office: Employers’ experiences in complying with the Hazard Communications Standard. GAO/HRD-92-63 BR, Washington (1992).

U.S. General Accounting Office: Occupational safety & health - OSHA action needed to improve compliance with Hazard Communication Standard. GAO/HRD-92-8, Washington (1991).

VISCUSI, W. K., ZECKHAUSER, R. J.: Hazard communication: Warning and risk. In: Ann. Of the Amer. Academy of Political and Social Science 545 (1996), pp.106-115.

VOULLAIRE, Ellen, KLIEMT, G.: Gefahrstoffe in Klein- und Mittelbetrieben: neue Wege überbetrieblicher Unterstützung. Schriftenreihe der Bundesanstalt für Arbeitsschutz: Forschung; Fb 703. Bremerhaven (1995).

VROM (Ministry of Housing, Spatial Planning, and Environment – The Netherlands), Arcadis Heidemij Advies, Eds.): European inspection project “Solid Enforcement of Substances in Europe” (SENSE). Final report, January (1998), 26p. + App.

WACHSMUTH, Harald: Sicherheitsdatenblätter für Gefahrstoffe - Querprüfungen zur Plausibilität. In: Sicherheitsingenieur Nr.5 (1996), S.18-21.

WANG, Hongjie, HONG, Yan: Set Your Sites on SDS Providers. In: Safety and Health, No.1 (1997), pp.58-60.

WINDER, Chris, NG, Steven K.: The Problem of Variable Ingredients and Concentrations in Solvent Thinners. In: Amer. Ind. Hygiene Assoc. J. 56, No.12 (1995), pp.1225-1228.

WIFI ÖSTERREICH / WKÖ (Wirtschaftskammer Österreich, Hg.): Leitfaden zum Ausfüllen eines Sicherheitsdatenblattes. WIFI Beratungsdienste, Wien (1996), 28S.

WOGALTER, M. S., SILVER, N. C.: Warning signal words - connoted strength and understandability by children, elders and nonnative english speakers. In: Ergonomics 38, No.11 (1995), pp. 2188-2206.

WOOD, S: Creative Writing of Hazard Data Sheets. In: Annals of Occ. Hygiene 33, No.4 (1989), pp.607-613.

WWA (WorkSafe Western Australia, ed.): SDS. In: Safety and Health Solutions, [online] Available: http://www.wt.com.au/safetyline/d_pubs/chem2.htm, Accessed Oct 10, 1998 (Last Update Feb 29, 1996).

APPENDIX 1: AUTHORITIES AND UMBRELLA ORGANISATIONS INTERVIEWED

Austria

Federal Ministry of Environment, Youth and Family Affairs, Department of Chemicals

Federal Environmental Agency, Department of Chemicals

Federal Ministry of Labour, Health & Social Affairs, Central Labour Inspectorate

Federal Ministry of Labour, Health & Social Affairs, Regional Labour Inspectorate

Municipality of Vienna, Chemicals Inspectorate

Austrian Association of the Chemical Industry

Germany

Factory Inspectorate of a Federal State

Bipartite Occupational Health and Safety Insurance Scheme
(Gewerbliche Berufsgenossenschaft)

Federal Institute for Occupational Safety and Health
(Bundesanstalt für Arbeitsschutz und Arbeitsmedizin - BAuA)

Chemical Industry Association (Verband der chemischen Industrie - VCI)

Netherlands

Labour Inspection of the directorate general of Labour

Inspectorate for the Environment of the Directorate General for the Environment, Directorate for Chemicals

External safety and radiation protection of the Directorate General for the Environment

The Dutch Association of Chemical Industry

Occupational Hygienist Service

APPENDIX 2: DESCRIPTION OF SME SECTORS

CAR REPAIR SHOPS

Activities of car repair companies mainly consist of cleaning of the cars, dismantling, plating, scouring, degreasing of parts to be painted, application of primers and fillers, mixing of the paints and spraying with the paint. Other activities include replacement of parts, the assembly of windows, airbags or open roofs and the repair of car-electronics. Insurance companies are one of the main clients of the activities executed. More often, the insurance companies decide on the basis of co-operation contracts by which companies the car-repair may be executed. In addition, car dealers also frequently contract out the car repair to specialised companies.

Car repair shops use a number of products such as solvents and water based degreasers, primers, fillers, paints, anti-corrosion products and polishing products (oils, cooling fluids). A considerable part of those products is labelled as dangerous according to European regulations.

The main items for occupational health include the exposure to solvent products (predominantly xylene, acetates and other aliphatic and aromatic solvents), exposure to dust particles from scouring and exposure to welding gasses.

PLASTIC PROCESSING COMPANIES

Activities of these companies consist mainly of mixing of the plastics with a number of additives, heating/designing of the mixture, fixation of the shape and finishing processes (e.g. printing, adhesives) and cleaning and degreasing operations of for example apparatus.

Besides the plastics themselves a number of additives are used in these processes such as lubricants, release agents, anti-oxidants, heat stabilisers, anti-statics, UV-stabilisers, preservatives, colouring agents, stitching agents, filling agents and consolidating agents, flame retardants and plasticizers. For the cleaning and degreasing operations mainly solvent products are used. For coating processes also urethanes, silicones, epoxys and PVC plastisol are used.

Occupational health problems in the companies mainly consist of the exposure to dust from plastics, exposure to solvents (e.g. toluene, acetone, dichloromethane and trichloroethyleen), plasticisers, styrene (when processing polyester resins) and formaldehyde.

DENTAL LABORATORIES

A number of different activities can be found in dental laboratories: construction of dental frames, manufacture of crowns and bridge work, manufacture of dentures and the repair of these items. Within a dental laboratory usually a number of departments can de distinguished. These are the gypsum, gold, porcelain, steel and denture departments. Usually the administration and dispatch are also considered separate departments.

For the production of dentures, first a gypsum model is cast. From this model the dentures are produced using a liquid monomer methylmethacrylate (MMA). By polymerisation the MMA is converted into the solid PMMA polymer. The object is finished by grinding and polishing. Metal dental frames are cast in so called silicate-based embedding mass, a product which can withstand temperatures of 1200-1300 degrees Celsius. After removal of the silicate mould, the object is finished by grinding and polishing. Crowns and bridges are manufactured from precious metals like gold, silver, palladium and platinum. For finishing purposes sometimes etching material (acids) and HF are used, but only in small quantities.

From an occupational hygiene point of view the most important chemical hazards in dental labs is constituted by the use of monomer MMA, which is a known sensitiser. Furthermore, the finishing (grinding and polishing) of the different products will usually result in the formation of nuisance dust. This is also true for working with gypsum. The embedding mass consists of crystalline silicates. Inhalation of crystalline silicates may result in silicosis and lung cancer. Furthermore the use of etching materials and HF constitute a chemical hazard.

METAL MANUFACTURING COMPANIES

This sector of industry is very diverse in its different techniques and applications. A large variety of chemicals can be used in this sector of industry depending on the type of activities the companies carry out. Companies which just assemble metal parts will presumably process just a few dangerous substances (predominantly degreasers, paints and lacquers).

More than half of the metal shops interviewed in this project deployed galvanic techniques. Metal processing companies with galvanic facilities tend to use a wide range of dangerous preparations: concentrated acids and alkaline solutions, metal salts (e.g. chromates), chemicals to control the process (complex-builders e.g. CN), and additives to enhance the efficiency and appearance of the product. Furthermore chemicals such as borates, permanganates, sulphides are used.

There are a number of different types of galvanic processes which differ in the method of application and the type of metal layer applied to the object. In general, the galvanic process can be described as the deposition of a layer of metal onto a metal object, to protect the object from detrimental external effects and to enhance the lifetime of the product. It is a type of industry in which large amounts of chemicals are used, usually in concentrated form.

The hazards associated with the use of these chemicals within this sector of industry are manifold. Due to the presence of many concentrated chemicals there is a relatively large danger of acute health hazards. It is furthermore known that some of the products can affect the skin (contact eczema) or result in irritation of the respiratory tract due to vapours present in the atmosphere. Furthermore, chromium (VI) salts are proven to be carcinogenic.

The hazards in other types of metal manufacturing can be compared to the risks described for car repair shops. Airborne strains also result from dusts (e.g. from scoring) and from the exposure to welding fumes. Many chemical working agents show adverse dermal effects.

APPENDIX 3: INTERVIEW QUESTIONNAIRES

Austrian Questionnaires

Dutch Questionnaires

German Questionnaires