Chapter 3

Material safety data sheets, correct and complete?

keywords: Material Safety Data Sheets (MSDS), toxics, European Union regulations.
Abstract

In European Union (EU) countries Material Safety Data Sheets (MSDS) should contain correct information required by EU regulations. As such MSDS may be useful for safety, protection of health and the environment.

During research concerning environmental management in four companies, eleven recent and randomly selected MSDS were evaluated for accuracy of human toxicological information. All the evaluated MSDS were found to be incorrect and / or incomplete. This complements earlier research showing that many MSDS are incomplete. We suggest that an independent agency should be set up to review MSDS whether they are accurate and complete or to make companies liable for the defects in the MSDS information provided.

Introduction

Protection of health and environmental management by companies handling toxics is dependent on adequate information concerning the compounds involved (Verschoor, 1997).

In the EU, Material Safety Data Sheets (MSDS) are supposed to contain information to implement measures necessary for safety, protection of health and the environment. The European Union has a directive relating to the information that should be contained in MSDS (91/155/EC modified by Directive 93/112/EC).

Recent research carried out into the implementation of these EU regulations in the Netherlands shows that information is usually incomplete when judged by the requirements set in the regulations (Veiligheidsinformatiebladenbesluit, 1993). The MSDS of 136 companies were reviewed (Oostveen, 1995). All the sixteen sections of the MSDS were judged against the information to be provided in the MSDS called for in the regulations. Only 4% of the MSDS that were included in the research were judged to be complete.

Incompleteness was found in all of the sixteen sections. Apart from completeness, the correctness of the information concerning protection of health and environment including toxicological information is an important element in the information included in MSDS. To approach this subject we randomly selected eleven recent MSDS that came to our attention in a research project involving four companies: a hospital, an industry and two in-company printing offices.
We checked the information of section 2, 8 and 11 of the MSDS against the literature, to find out whether they were accurate and complete. These sections are included in the sixteen sections that are obligatory. Section 2 should give product composition and information about the components. Not all of the components have to be mentioned, only the materials mentioned in article three of the Directive 88/379/EU and the materials dangerous to health, given in Directive 67/548/EC.

Section 2 of the MSDS should also contain symbols and R (Risk) sentences. Section 8 should contain personal safety related precautionary measures, measures to limit exposure to the product to a minimum and Threshold Limit Values, i.e. occupational exposure limits (legal limits for worker exposure; in the Netherlands MAC value).

Section 11 should give toxicological information, including short-term and long-term toxicity and chronic effects (sensibilisation, carcinogenic, mutagenic and reprotoxic effects). Section 11 should also contain specific effects of components on health.

**Method**

During a recent project we randomly selected eleven recent MSDS. The toxicological information was checked against the open literature (section 2, 8, 11 of the MSDS). For this purpose we used the data described in the literature. We assumed data in the open literature to be correct. For some products additional information was obtained from the supplier.
<table>
<thead>
<tr>
<th>Product components</th>
<th>Correctness</th>
<th>Completeness</th>
</tr>
</thead>
</table>
| **Product 1** Ryzolin Non Sol-1  
Components 2- aminoethanol >1% (weight). | The MAC value is not correct. | The unit of the MAC value is missing. |
| **Product 2** Safe Wash, WM 40  
Components naphtenic hydrocarbons < 90% (weight), aliphatic hydrocarbons < 20% (weight). | *Both components have the same CAS registry number.  
*The product is formulated without the use of materials which are toxic, carcinogenic or have reprotoxic effects. This statement is incorrect. | Information concerning skin and eye protection are missing. |
| **Product 3** Blanco fresh NW-110  
Components dimethyladipate < 80% (weight), aromatic hydrocarbons < 30% (weight). | The product is formulated without the use of materials which are toxic, carcinogenic or have reprotoxic effects. This statement is incorrect. | *The R sentence (61 or 63) is missing.  
*Information concerning skin and eye protection is missing.  
*Toxicological information. Long-term effects are missing like: dimethyladipate has teratogenic and reprotoxic effects. |
| **Product 4** Anchor 70111W Wash R-228  
Components hydrotreated heavy naphtha > 50% solvent naphtha 20-50%, 1-methoxy-2-propanol 5-20%, 2-butoxyethanol 1-5%. | *The Treshold Limit Values are missing, (they are however present in section11).  
*The toxicological information is missing, instead MAC values are mentioned. | |
| **Product 5** Anchor 70041 W Kendu  
Components Stoddard solvent petroleumdestillate 20-50%, solvent naphtha, light aromatic 20-50%, 1-methoxy-2-propanol, 5-20%, 2-butoxyethanol, 5-10%, 2-propanol, 1-5%. | *The R sentence (61 or 63) is missing.  
*The Treshold Limit Values are missing, (they are however present in section11). The toxicological information is missing, instead MAC values are mentioned. | |
<table>
<thead>
<tr>
<th>Product 6 Cidex</th>
<th>Components glutaraldehyde 22,0 g/l.</th>
<th>correctness</th>
<th>completeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product 7 Sterillium</td>
<td>Components propane-2-ol is 45%</td>
<td>The product is irritating, (mentioned is not irritating).</td>
<td>*The sections are not numbered, some sections are missing. *R sentences are missing. *The toxicological information is missing.</td>
</tr>
<tr>
<td>Product 8 Hibisol</td>
<td>Components chlorhexidine digluconate, propane-2-ol</td>
<td>*The MAC value given and time mentioned for (exposure to) chlorhexidine are inconsistent, and therefore incorrect. *Eye protection is needed *To use gloves for a product mentioned to wash or sterilize your hands is strange.</td>
<td>*Concentrations are not mentioned. *Toxicological information Long-term effects are missing.</td>
</tr>
<tr>
<td>Product 9 Lyorthol</td>
<td>Components 4-chlor-2-benzylphenol 35 g/l, 2-phenylphenol 32 g/l.</td>
<td>*Skin protection is definately needed, as the product is a skin irritant and causes burns. *The unit mg/ml used for the MAC phenol is not correct. The data refer to mg/m3.</td>
<td>*Toxicological information Short- and long-term effects are missing like the product is a severe eye irritant (4- chlorophenyl-o-cresol) and human mutation data reported.</td>
</tr>
<tr>
<td>Product 10 Rapwas</td>
<td>Components aliphatic hydrocarbons 100 %</td>
<td>Section 3 states: the aliphatic hydrocarbons contain 20 % aromatic hydrocarbons. This is inconsistent with section 2 (see components). Section 12 states that the product contains no mono-aromatic hydrocarbons.</td>
<td></td>
</tr>
<tr>
<td>Product 11 Nebol 2000</td>
<td>Components aliphatic hydrocarbons, (aromatic hydrocarbons with a maximum of 0,05 %)</td>
<td>The R- sentence is missing (R10).</td>
<td></td>
</tr>
</tbody>
</table>
Discussion and Recommendations

All eleven recent MSDS covered in this research were found to be defective, that is incorrect and/or incomplete regarding the information that is relevant to protection of health and the environment. The data presented here complement earlier research (Oostveen, 1995) in which was found that MSDS as used in the Netherlands are usually incomplete.

The inaccuracy and incompleteness is moreover significant when considered from the point of view of environmental and health protection. This may give rise to inaccurate judgment and insufficient protection.

Some components of products, for instance like Stoddard solvent, are a mixture of aliphatic and aromatic hydrocarbons. The MAC values of the components may differ considerably (e.g. trimethylbenzene 25 ppm and nonane 200 ppm). In view of these differences it should be considered to mention the MAC value of each individual component in this kind of mixtures. The specific effects of individual components of such mixtures on health should, we feel, be mentioned in section eleven of the MSDS.

On the basis of the information given in the MSDS (meant for the professional user) persons concerned must be able to implement measures necessary for safety, protection of health and the environment. Although only part of the information given by the MSDS (section 2,8,11) was reviewed for its accuracy and completeness, the results show that current MSDS are far from adequate. It is recommended that an independent agency be set up to review the MSDS provided by the supplier if they are accurate and complete. Another possibility is to make companies liable for the consequence if their own MSDS are inaccurate or incomplete.

We also feel that many users will experience difficulties in understanding these complex data. It seems moreover unreasonable to expect that all professional users will become, in the foreseeable future, experts in toxicology. Therefore it should be considered (in analogy to pharmaceutical information sheets) to develop two different MSDS, one with information for persons with expertise in workplace toxicology and one for persons that are lay persons in that respect. Definitive conclusions cannot be drawn from this small sample MSDS, further investigations are necessary. A full report is available on request.
Acknowledgement

We want to thank dr. M.A. Maclaine Pont for her comments on this article.

References

2. American Conference of Goverment Industrial Hygienists, Cincinnati (OH).
7. British Journal of Industrial Medicine, 50, 107-111.


**Abbreviations**

IARC  International Agency for Research on Cancer  
CAS  Chemical Abstract Service  
LD50  Lethal Dose Fifty - a calculated dose of material which is expected to cause the death of 50% of an entire defined experimental animal population.  
MAC  Maximale Aanvaarde Concentratie (legal limits for workers exposure)  
MAC-C  Maximale Aanvaarde Concentratie - Ceiling  
OEL  Occupational Exposure Limit  
ppm  parts per million  
TGG  Tijd Gewogen Gemiddelde  
TLV  Threshold Limit Value
Abstract

In European Union (EU) countries Material Safety Data Sheets (MSDS) should contain complete and correct information required by EU regulations. As such MSDS may be useful for safety, protection of health and the environment. During research concerning environmental management in four companies, twelve recent and randomly selected MSDS were evaluated for accuracy of human toxicological information. All the evaluated MSDS were found to be incorrect and/or incomplete. This complements earlier research showing that many MSDS are incomplete. We suggest that an independent agency should be set up to review MSDS whether they are accurate and complete or to make companies liable for the defects in the MSDS information provided.

Introduction

Protection of health and environmental management by companies handling toxics is dependent on adequate information concerning the compounds involved (Verschoor and Reijnders, 1997). In the EU, Material Safety Data Sheets (MSDS) are supposed to contain information to implement measures necessary for safety, protection of health and the environment. The European Union has a directive relating to the information that should be contained in MSDS (91/155/EC modified by Directive 93/112/EC).

Recent research carried out into the implementation of these EU regulations in the Netherlands shows that information is usually incomplete when judged by the requirements set in the regulations (Veiligheidsinformatiebladenbesluit, 1993). The MSDS of 136 companies were reviewed (Oostveen, 1995). All the sixteen sections of the MSDS were judged against the information to be provided in the MSDS called for in the regulations. Only 4% of the MSDS that were included in the research were judged to be complete. Incompleteness was found in all of the sixteen obligatory MSDS sections specified in the regulations. Apart from completeness, the correctness of the information concerning protection of health and environment including toxicological information is an
important element in the information included in MSDS.

To approach this subject we randomly selected twelve recent MSDS that came to our attention in a research project involving four companies: a hospital, an industry and two in-company printing offices. We checked the information of sections 2, 8 and 11 of the MSDS against the literature, to find out whether they were accurate and complete. These sections are included in the sixteen sections that are obligatory. Section 2 should give product composition and information about the components. Not all of the components have to be mentioned, only the materials mentioned in article three of the Directive 88/379/EU and the materials dangerous to health, given in Directive 67/548/EC. Section 2 of the MSDS should also contain symbols and R (Risk) sentences. Section 8 should contain personal safety related precautionary measures, measures to limit exposure to the product to a minimum and Threshold Limit Values, i.e. occupational exposure limits (legal limits for worker exposure; in the Netherlands MAC values). Section 11 should give toxicological information, including short-term and long-term toxicity and chronic effects (sensibilisation, carcinogenic, mutagenic and reproductive effects). Section 11 should also contain specific effects of components on health.

Information to be provided by the MSDS

sixteen sections (93/112/EC)

1. identification, trade name, manufacturer/importer;
2. product composition and information about the components, not all the components have to be mentioned, only the materials according article three directive 88/379/EU and material dangerous for health according directive 67/548/EC, Risk(R) sentences and symbols;
3. risks, the most important risks for men and environment, this information must be conform the label on the product;
4. first aid, a description of symptoms and effects;
5. instructions in case of fire;
6. precautionary measures in case of accidental release of the substance, precautionary measures to prevent polluting of the environment;
7. storage and handling instructions;
8. personal safety precautionary measures, measures to limit the exposition to the product to a minimum and Threshold Limit Values, i.e. occupational exposure limits (legal limits for worker exposure; in the Netherlands MAC value);
9. physical and chemical properties;
10. stability and reactivity;
11. toxicological information, short term, longterm and chronical effects (sensibilisation, carcinogenic, mutagenic and reprotoxic effects), specific effects of components on health;
12. ecological information, effects on the environment, mobilisation, breakdown, accumulation, ecotoxicity, other effects;
13. cleaning instructions;
14. transport information;
15. information due by law; this information must be conform the label on the product;
16. additional information important for safety, protection of health and environment.

Method

We randomly selected twelve recent MSDS that were used at companies in environmental care projects. The toxicological information was checked against the open literature (section 2,8,11 of the MSDS). For this purpose we used the data described in the literature. We assumed data in the open literature to be correct. For some products additional information was obtained from the supplier.
Results

Product 1
Ryzolin Non Sol-1 (Hijmeco B.V.).
The product is used as a detergent by industries.
MSDS section 2 (product composition, dangerous compounds) contains the information that the content of 2-aminoethanol >1% (weight).

Section 8 (personal safety precautionary measures) contains the information:
MAC 330 calculated on the content of 2-aminoethanol.
Correctness:
The unit in the MAC value is missing and only the MAC value of the dangerous component should be given. Thus the MSDS should state: 2-ethanolamine MAC-TGG 3 ppm (SAX, 1992, ACIGH, 1989, Nationale MAC-lijst, 1994). (TGG is the time weighted average relating a maximum exposition of eight hours a day and forty hours a week.)

Product 2
Safe Wash- WM 40 (Hartmann Products B.V.).
The product is used in printing offices.
MSDS section 2 (product composition) states that the product is a mixture of organic solvents:
* naphtenic hydrocarbons < 90% (weight),
* aliphatic hydrocarbons < 20% (weight).

Section 8 (safety precautionary measures) contains the information:
* naphtenic hydrocarbons, Occupational Exposure Limit (OEL) 300 parts permillion (ppm)
* aliphatic hydrocarbons, OEL 300 ppm.

respiration protection: protection must be used if exposure is possible that exceeds the occupational exposure limit.

hand protection: use gloves,
eye protection: use safety glasses,
skin protection: use protecting clothes.

Comments:
(Both components have the same CAS (Chemical Abstract Service)-registry number.) The information as to the OEL could not be checked against the literature as there were no open literature data concerning the OEL of these hydrocarbons.

Section 11 (toxicological information). The MSDS states: the product is formulated without the use of materials which are toxic, carcinogenic or have reproductive effects.

* contact with the eyes: can cause irritation,
* contact with the skin: long-term contact can cause irritation,
* respiration: nausea, feeling drunk.

Correctness:
Based on the information given in the MSDS, it is not possible to state that the product is formulated without the use of materials which are toxic.

Product 3
Blanco fresh NW-110 (Hartmann Products B.V.).
The product is used in printing offices.

MSDS section 2 (product composition) contains the information:
* dimethyladipate < 80 % (weight),
* aromatic hydrocarbons < 30 % (weight).

According to section 3: trimethylbenzene is present in the aromatic hydrocarbons. Trimethylbenzene has an OEL of 25 ppm.

Section 8 (personal safety precautionary measures) contains the information:
* dimethyladipate OEL: no data,
* aromatic hydrocarbons: OEL 50 ppm.

respiration protection: protection must be used if exposure is possible above the OEL,
hand protection: use gloves,
eye protection: use safety glasses,
skin protection: use protecting clothes.
Section 11 (toxicological information). The MSDS states: the product is formulated without the use of materials which are toxic or reprotoxic or carcinogenic.

* contact with the eyes: can cause irritation,
* contact with the skin: long-term contact can cause irritation,
* swallowing: effects unknown,
* respiration: nausea, feeling drunk.

Correctness:

* contact with the eyes: can cause irritation,
* contact with the skin: long-term contact can cause irritation,
* swallowing: effects unknown,
* respiration: nausea, feeling drunk.

Product 4

Anchor 70111W Wash R-228 (Tetterode Nederland B.V.).

The product is used in printing offices.

MSDS section 2 (product composition) contains the information:

* hydrotreated heavy naphtha > 50 % (weight or volume, not given),
  no aromatic hydrocarbons present,
* solvent naphtha 20 - 50 %,
* 1-methoxy-2-propanol 5 - 20 %,
* 2-butoxyethanol 1 - 5 %.

Section 8 (personal safety precautionary measures) contains the information:

* respiration protection: in case of insufficient ventilation carry airway protection,
* hand and eye protection: recommended,
* skin protection: -

Comment:

* contact with the eyes: can cause irritation,
* contact with the skin: long-term contact can cause irritation,
* swallowing: effects unknown,
* respiration: nausea, feeling drunk.

Section 11 (toxicological information) contains the information:

* hydrotreated heavy naphtha: MAC 100 ppm,
* solvent naphtha: MAC 100 ppm,
* 1-methoxy-2-propanol: MAC 100 ppm (the substance penetrates the
Correctness and Completeness:
The solvent naphtha contains trimethylbenzene (MAC 25 ppm), this information is omitted. No short or long term effects are mentioned, neither evidence for the reprotoxic effects. Solvent naphtha and 2-butoxyethanol have reprotoxic effects (Sax, 1992, RTECS, 1995). The 2-butoxyethanol is classified as toxic for reproduction in class 3 according to the EU criteria. There is no legal need for the manufacturer to mention this classification because there is no European classification for the moment. But based on legal obligation (Official Journal of the European Communities, 1993) the manufacturer has to mention in section 2 the sentence R 61 or R 63 (R 61: can harm the unborn child.)

Product 5
Anchor 70041 W Kendu (Tetterode B.V.).
The product is used in printing offices.
MSDS section 2 (product composition) contains the information:
* Stoddard solvent petroleumdestillate 20-50%,
  solvent naphtha, light aromatic 20-50%,
* 1-methoxy -2- propanol, 5-20%,
* 2- butoxyethanol, 5-10%,
* 2- propanol, 1-5%.

Section 8 (safety precautionary measures) contains the information:
* respiration protection: keep sufficient ventilation,
* hand and eye protection: recommended,
* skin-protection: -

Comment:
The Threshold Limit Values are missing. (They are however present in section 11). It is hard to judge what is sufficient ventilation.

Section 11: (toxicological information) contains the information:
* Stoddard solvent: MAC 100 ppm,
  solvent naphtha, light aromatic: MAC 100 ppm,
* 1-methoxy -2- propanol: MAC 100 ppm (the substance penetrates the skin),
* 2- butoxyethanol: MAC 20 ppm, MAC - TGG 15 min. 40 ppm, (the substance penetrates the skin),
* 2- propanol: MAC 400 ppm.
Some LD 50 values are mentioned also.
Correctness and Completeness:
The Stoddard solvent and the solvent naphthta contain trimethylbenzene (MAC 25 ppm).
No short or long term effects are mentioned, nor the reprotoxic effects (see product 4, section 11). (Sax, 1992, ACGIH, 1989, Nationale MAC-lijst, 1994, RTECS, 1995, LARC, 1987).

**Product 6**

Cidex (Johnson & Johnson Medical B.V.).
The product is used in hospitals for sterilising endoscopes.
Comment:
The sections of the MSDS are not numbered, some are missing.
Section ‘Product composition’ contains the information:
* glutaraldehyde 22,0 g/l.

Section ‘Limit values’ contains the information:
* glutaraldehyde MAC-C 0,25 mg/ m3.

Section ‘Symbols’, contains the information:
* symbol (Xi) irritation has to be noted,
* use protective gloves and eye protection,
* in case of eye contact rinse extensively with water and seek medical advice,
* prevent longterm exposure to the vapour by mechanical ventilation.

Correctness and Completeness:
Toxicological information is missing. The R sentences are missing. Short and longterm effects are missing. Information concerning skin protection is missing.
According to literature glutaraldehyde is moderately toxic by inhalation and skin contact. It is also a severe skin and eye irritant. No mention is made of mutagenic effects (data reported) or teratogenic and reprotoxic effects (Sax, 1992, RTECS, 1995).
The advice to use mechanical ventilation (to prevent long-term exposure to the vapour) seems
inadequate. In normal open use the MAC value is easily exceeded (Leinster, 1993).

Product 7
Sterillium (Beiersdorf N.V.).
The product is used for washing/sterilising hands in hospitals.

MSDS section 2 (product composition) contains the information that the content of propane-2-ol is 45%.
Completeness:
The second component, propane-1-ol is missing in this section.

Section 8 (personal safety precautionary measures) contains the information:
* propane-2-ol 25 - 50 %: TLV 980 mg/m³, TLV 400 ml/m³,
* propane-1-ol 25 - 50 %: TLV 500 mg/m³, TLV 200 ml/m³.
Take care of the usual precautionary measures when dealing with chemicals.
Wash your hands before the break and at the end of the job.
respiration protection: not necessary,
hand-protection: not necessary,
eye-protection: not necessary.
Comments and Incorrectness:
A sentence to wash your hands after the job is strange when the product is meant to wash/sterilize the hands.
No mention is made of the need for respiration protection in case the MAC value is exceeded.

Section 11 (toxicological information) contains the information:
Primary effect,
on the skin: not irritating,
on the eye: not irritating.
Correctness and Completeness:
The product is irritating: the components are eye and skin irritant (propane-2-ol), severe eye and skin irritant (propane-1-ol) (Sax, 1992).
Short-term effects are missing, propane-2-ol is mildly toxic by skin contact and propane-1-ol is moderately toxic by inhalation and / or ingestion.
Longterm effects are missing, the same holds for mutation data reported, teratogenic and reprotoxic effects. (Sax, 1992, RTECS, 1995, LARC, 1987).

**Product 8**

Hibisol (Zeneca).

The product is used for washing/sterilising hands in hospitals.

MSDS section 2 (product composition) contains the information:
* chlorhexidinedigluconate, symbol Xi,
* propane-2-ol, symbol F.

Completeness:
The concentration of chlorhexidinedigluconate is not mentioned in this section.

Section 8 (personal safety precautionary measures) contains the information:
* propane-2-ol MAC-TGG during 8 hours 400 ppm (980 mg/m3) MAC-H (H means the substance penetrates the skin),
* chlorhexidinedigluconate MAC-TGG-15 min. 0,1 mg/m3, Time 10 min. COM.

respiration protection: when exposure above the exposure limit is possible use protection,
hand-, eye- protection: use safety glasses and gloves when this product is used in large quantities.

Correctness:
The MAC value given and time mentioned for (exposure to) chlorhexidine are inconsistent, and therefore incorrect.

When the product is used in normal quantities eye protection is needed (Sax, 1992).
To use gloves for a product mentioned to wash or sterilize your hands is strange.

Section 11 (toxicological information) contains the information:
Inhalation, the vapour decreases consciousness, inhalations of concentrations above the MAC can lead to headache, dizziness, decreased concentration and unconsciousness,
Skin: remove the natural fats from the skin leading to scaling and dermatitis,
Eyes: irritating,
Swallowing: can lead to irritation of the gastrointestinal tract, with effects comparable to those after inhalation.

Correctness and Completeness:

* Effects like mutation data reported, teratogenic and reprotoxic effects (experimental), are missing. Data showing mutagenicity in propane-2-ol and chlorhexidine are not mentioned. Parachloraniline a contaminant present in preparations containing chlorhexidine, has been suggested to be a potential carcinogen (Sax, 1992, RTECS, 1995, Gilman, 1977, Case, 1977).

**Product 9**

Lyorthol (Medica B.V.).

The product is used as a desinfectant for floors and rooms in hospitals.

MSDS data section 2 (product composition) contains the information:

* 4-chlor-2-benzylphenol 35 g/l,
* 2-phenylphenol 32 g/l.

Section 8 (personal safety precautionary measures) contains the information:

MAC phenol 5 ppm, 19 mg/ml, the substance penetrates the skin. Respiration protection: in case of concentrations above the MAC, use filtertype A, hands: use rubber gloves, eyes: safety glasses, skin:-

Completeness:

* Skin protection is definitely needed, as the product is a skin irritant and causes burns. The unit mg/ml used for the MAC phenol is not correct. The Mac value refers to mg/m3.

Section 11 (toxicological information) contains the information:

Short term effects: causes burns,

Long term effects: 2-phenylphenol can cause skin allergy,

Chronic effects:-

Completeness:

* Information as to short-term effects such as the product is a severe eye irritant (2-phenylphenol) and is moderately toxic by ingestion are missing. Information relating to human mutation data reported is also missing. (Sax, 1992, RTECS, 1995).
Product 10
Rapwas (Blikman & Sartorius).
The product is used in printing offices.

MSDS section 2 (product composition) contains the information that the product consists of aliphatic hydrocarbons 100%.

Correctness:
Section 3 states: the aliphatic hydrocarbons contain 20% aromatic hydrocarbons. This is inconsistent with section 2. Section 12 states that the product contains no mono-aromatic hydrocarbons.

Section 8 (personal safety precautionary measures) contains the information:
OEL aliphatic hydrocarbons 100 ppm.
respiration protection: in well ventilated rooms protection is not needed. When vapour concentrations are high use a charcoal filter,
hand protection: use rubber gloves,
eye protection: use safety glasses.

Section 11 (toxicological information). The MSDS states: the product comprises no substances which are carcinogenic or mutagenic.
contact with the eyes: can cause irritation,
contact with the skin: longterm contact can cause irritation and delipidation,
swallowing: effects unknown,
respiration: effects nausea and faintness.
Correctness:
The product contains 20% aromatic hydrocarbons, so it seems likely that the product may contain substances which are carcinogenic and/or mutagenic.

Product 11
Nebol 2000 (Nederlandsche Benzol Maatschappij B.V.).
The product is used for cleaning metal parts by industries.

Comment:
The MSDS was accompanied with the request to consider the information in the MSDS as
confidential. But the information in the MSDS is a legal obligation required by EU regulations.

MSDS section 2 (product composition) contains the information that the product consists of a mixture of aliphatic hydrocarbons. The mixture contains aromatic hydrocarbons with a maximum of 0.05% (volume).

Completeness:
The R-sentence (10) is missing.

**Product 12**
‘Neutralisierungsfarbe für Giroform’
The product is used in printing-offices.

Comment:
We received two completely different MSDS, one was derived from the manufacturer (Sicpa) in Switzerland and was written in German, the other was required from the supplier in the Netherlands (Stora) and was written in Dutch.

MSDS (Stora)
Comment:
The sections of the MSDS are not numbered, some are missing. The MSDS consists of 1 page.

Section ‘Product Composition’ contains the information:
High-molecular propoxilated varnish with titanium dioxide. The product reacts neutral and does not evaporate.
The section ‘Product description’ states, the product has a light smell.
Comment:
The product does not evaporate, what is smelling?

Completeness:
The section ‘Personal safety precautionary measures’ is missing.

Section ‘No dermatological and toxicological burdens’ contains the information:
The product does not have objections by appropriate use.
LD 50 > 12 g/kg,
oral use: not dangerous or poisonous
skin irritation: by long-term use skin irritation can appear,
sensibilisation: no.

MSDS (Sicpa).
Section 2 (product composition) contains no information, instead a letter is attached with the product composition, for only 1 out of the 5 components the percentage is mentioned.
The letter states: these informations must be treated confidentially.

Section 8 (personal safety precautionary measures) contains the information:
respiration protection: no,
handprotection: gloves recommended,
eye protection: safety glasses recommended,
进一步: use appropriate work clothing.

Section 11 (toxicological information) contains the information:
sensibilisation: no,
skin irritation: no,
LD 50 > 5000 mg/kg.

Comments:
The 2 acquired MSDS about the same product differ a lot. The Stora MSDS consists of 1 page information and is far from complete and not correct, the sections are not mentioned and some sections are missing.
The Sicpa MSDS consists of 4 pages information, all sections are present.
Caused by the confidential product information it is hard to give a description of the correctness and completeness of the MSDS. But information in the sections is contradictory. Section 11 states the product is not irritating, section 8 recommends hand-, skin- and eye-protection.
Discussion

All twelve recent MSDS covered in this research were found to be defective, that is incorrect and/or incomplete regarding the information that is relevant to protection of health and the environment. The data presented here complement earlier research (Oostveen, 1995) in which was found that MSDS as used in the Netherlands are usually incomplete.

The inaccuracy and incompleteness is moreover significant when considered from the point of view of environmental and health protection. Omitted warnings concern eye protection (product 7), skin protection (several products), mutagenicity and suspected carcinogenity (several products) and reproductive risk (several products). This may give rise to inaccurate judgment and insufficient protection.

In the case of MAC/TLV values, some quantitative data (product 1,8) and units (product 1,9) were incorrect. Some components of products, for instance like Stoddard solvent, are a mixture of aliphatic and aromatic hydrocarbons. The MAC values of the components may differ considerably (e.g. trimethylbenzene 25 ppm and nonane 200 ppm). In view of these differences it should be seriously considered to mention the MAC value of each individual component in this kind of mixtures. The specific effects of individual components of such mixtures on health should, we feel, have to be mentioned in section eleven of the MSDS.

Sentences as “The product is formulated without the use of materials which are toxic, carcinogenic or have reproductive effects” (product 2 and 3) when the product contains such materials are misleading. It should also be noted that sentences like “Use gloves” or ‘Wash your hands before a break and at the end of the job’ are strange when the product is meant to wash/sterilize the hands (product 7,8).

Product 4 contains 1- methoxy-2- propanol, the isomer 2- methoxy-1- propanol is reprotoxic (Maclaine Pont, 1993). When the concentration of 2- methoxy-1- propanol in 1- methoxy-2- propanol is less then 5 %, the manufacturer is not obliged to state that the product is reprotoxic. We feel however the user has the right to know that a potential reprotoxic substance is present. The risk might be low, but the effect can be very severe.
Recommendations

On the basis of the information given in the MSDS (meant for the professional user) persons concerned must be able to implement measures necessary for safety, protection of health and the environment. Although only part of the information given by the MSDS (section 2,8,11) was reviewed for its accuracy and completeness, the results show that current MSDS are far from adequate. In a larger survey into whether the MSDS were complete the same conclusion was reached (Oostveen, 1995). It is recommended that an independent agency be set up to review the MSDS provided by the supplier if they are accurate and complete. Another possibility is to make companies liable for the consequence if their own MSDS are inaccurate or incomplete.

We also feel that many users will experience difficulties in understanding these complex data in MSDS. It seems moreover unreasonable to expect that all professional users will become, in the foreseeable future, experts in toxicology. Therefore it should be considered (in analogy to pharmaceutical information sheets) to develop two different MSDS, one with information for persons with expertise in workplace toxicology and one for persons that are lay persons in that respect. Definitive conclusions cannot be drawn from this small sample MSDS, further investigations are necessary.

References


