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*The Material Safety  
Data Sheet (MSDS)*

## **CURRENT SCIENTIFIC TOPICS FOR ATTORNEYS**

### **The Material Safety Data Sheet (MSDS)**

Your client may have been exposed to a harmful chemical in the workplace, or to a dangerous amount of caustic substance in a consumer product at home. Information to guide or augment discovery is readily available about potentially harmful chemicals in industrial and retail consumer settings. This information is given in a document called a material safety data sheet. The material safety data sheet can provide a wealth of information and data for discovery purposes. This article discusses the material safety data sheet with respect to the kinds of information and data it does and does not contain. It further discusses the accuracy and completeness of its data and guidance, where they can be obtained, and typical applications of the information for use in the in litigation.

### **What is a material safety data sheet?**

As reported by OSHA, more than 32 million workers are exposed to approximately 650,000 hazardous chemical products annually. Federal and state laws have been enacted to ensure that employees can obtain information regarding the health and safety hazards of the materials in their workplace and to understand the risks to protect themselves properly. In 1986, the OSHA Hazard Communication Standard (see 29 CFR 1910.1200) required employers to maintain documents containing certain mandatory information and chemical data in a structured format about hazardous materials in the workplace. These documents are called material safety data sheets or, more conveniently, MSDSs. The MSDS is required for those materials that are hazardous according to federal regulatory definitions of materials that pose physical hazards and health hazards, and for those hazardous materials to which an employee may be exposed during the normal conditions of his or her employment and during foreseeable emergency conditions. Also the U.S. EPA made the production and distribution of MSDSs a part of the Emergency Planning and Community Right-To-Know Act (1986), the Toxic Substances Control Act (1988), and the Superfund Amendments and Reauthorization Act (1986).

The MSDS must identify the chemical product manufacturer, importer or distributor by name, address and phone number. It must identify each specifically listed or suspected (under General Duty) hazardous ingredient by proper chemical name, Chemical Abstracts Service Registry Number (CAS), and by its amount in the product. It gives the human exposure limits, if they are known, in a variety of formats and the effects of exposure on various target organs. Other important information will include first aid measures; fire and explosion data; such physical data as boiling point, melting point, and specific gravity; precautions for safe handling and use; disposal information; transport information; and applicable federal and state regulatory information.

The MSDS document typical format and language is shown in Figure 1. This document pertains to the common household and janitorial product, Windex®-Blue manufactured by Drackett Products. Compliant material safety data sheets may have a variety of text and graphical formats. The Windex® MSDS consists of the minimum eight sections that are required by law using the OSHA 174 MSDS form. A more comprehensive format containing 16 sections was developed by the American National Standards Institute. It is promulgated as ANSI standard Z400.1 and it is now used widely throughout the industrialized world.

The 200 million or so retail consumers in the United States do not have the same level of mandated protection as an employee in a workplace. The retail consumer of paints, health and beauty products, household cleaners, insecticides, and so on has little more to rely on for product knowledge than product advertising, package labels and package inserts. However, material safety data sheets are often available for such products especially when they are used by employees in a commercial or industrial setting, as in the case of the glass cleaning product mentioned above. If the MSDS cannot be located for the formulated product, separate MSDSs can be obtained for the product ingredients, as long as those ingredients are considered hazardous by some criterion.

Many materials, intermediates and products are exempt from the Hazard Communication Standard therefore, they don't require a MSDS. In general, products that are regulated by other federal agencies are exempt. Such product categories include foods, alcoholic beverages, drugs and pharmaceuticals, cosmetics, hazardous wastes, tobacco products, biohazards, radiation hazards, wood and lumber products, and consumer products. There are, however, exceptions to the above.

An example of one exception that may be instructive is based on a manufactured article that is fully functional and in final form. An article does not require a material safety data sheet because it is considered inert and benign. OSHA defines an article in the Hazard Communication Standard as follows:

“Article” means a manufactured item: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which does not release, or otherwise result in exposure to, a hazardous chemical under normal conditions of use.

A molded fiber reinforced plastic cover on a lawnmower engine would probably be considered an article by both the cover manufacturer and the lawnmower manufacturer. The cover manufacturer would not enclose a MSDS with the first shipment of covers, nor would the lawnmower manufacturer expect to receive one. If, however, a problem in final assembly of lawnmowers requires retrofitting the molded cover by drilling or milling it and the machining process causes the release of a hazardous chemical or a listed respirable dust, then the molded cover would require a MSDS to be prepared and to be readily available to the lawnmower assembly workers.

## **How good is the information in a material safety data sheet?**

Perhaps it is better to ask: Who can write a MSDS? And, what qualifications are required of the writer? The short answers are anyone and none. Many large companies that manufacture and distribute raw chemicals and formulated materials have a department or dedicated personnel for dealing with health, safety, environmental and other regulatory affairs. The person in the department who has the authority for approving the technical content of a new or revised MSDS for a given material will probably be a professional having education and experience in industrial hygiene, toxicology, hazardous materials chemistry, environmental chemistry or a related discipline.

A large number of simple to complex chemical-based materials come from companies that have no staff who are specifically qualified in health, safety and environmental matters. In such cases, MSDSs are produced and approved by such technical staff as the R&D manager, the Quality Assurance manager, or the chemist who formulated the product. Sales personnel, senior management and legal staff can and have influenced the technical content of MSDSs and the derivative product labels.

In a study of the accuracy of MSDSs that was reported in the February 1995 issue of the American Industrial Hygiene Journal, the researchers found that roughly 2 of 3 MSDSs had inaccurate health effects data. Moreover, sections that addressed first aid measures and recommendations for personal protective equipment were so broad or generic that their usefulness was compromised. Other studies that were cited revealed that a significant number of MSDSs reviewed were in violation of one or more OSHA mandated requirements.

The OSHA Hazard Communication Standard is performance based. The Standard requires that MSDSs be prepared and that they contain certain kinds of information. How the MSDS is produced and by whom is up to the manufacturer, importer or distributor. Neither OSHA nor any other federal or state agency oversees, checks or approves MSDSs. Thus, the accuracy, quality and conformance of these documents runs the gamut from excellent and very useful to poor, noncompliant and marginally useful.

## **Does the MSDS list all ingredients?**

The MSDS may describe a product that consists of one chemical substance or one that is a complex formulated product that contains many chemicals. The requirement is that hazardous substances must be identified and described. Chemical substances that pose no physical hazards, health hazards or environmental hazards do not have to be listed.

Although a detailed discussion of what makes a material hazardous goes beyond the scope of this article, there are numerous definitions. The United States, Canada, Mexico, and many other nations have regulatory definitions of chemical materials that are physical hazards, hazards to the environment and health hazards. There are also lists that identify these chemicals and specify maximum contents or concentrations. In the United States, these lists apply to the workplace (OSHA), transportation (DOT) and to the environment (U.S. EPA's Clean Air Act, Clean Water Act, Toxic Substances Control Act, and California's Proposition 65). In general, any material is

considered hazardous if it is a(n) explosive, compressed gas, flammable liquid, flammable solid, oxidizer, biohazard (poison, infectious, carcinogenic), or corrosive (to skin and other body tissues).

As a typical example, the MSDS for Windex© in Figure 1 states that the product contains less than three percent isopropyl alcohol (the same alcohol found in household rubbing alcohol) and less than 2 percent 2-butoxyethanol. The latter is a moderately hazardous substance that can be found in some floor wax strippers, paints, and other cleaning products. These concentrations add up to about five percent. What about the other approximately 95 percent of the material? Drackett Products does not have to disclose the other ingredients because Drackett does not consider them hazardous to safety, to health or to the environment.

The other major reason for not disclosing the chemical identity of an ingredient is that it is a trade secret. OSHA and EPA impose certain requirements on those who claim trade secret status. However, the hazardous properties and their effects must still be given for a material listed on a MSDS as proprietary or trade secret.

### **Where can MSDSs be found?**

A contractor of services such as painting to a downstream consumer is under no legal obligation to provide a MSDS for the paints and thinners to the customer, nor, is the product seller required to provide a MSDS to the retail customer. The good news, however, is that many suppliers of chemicals and suppliers of formulated products, such as paints and coatings, will provide a MSDS to anyone who asks for it by calling or faxing the appropriate company office. Product labels often provide a toll-free telephone number for such requests. Happily, it is now possible to download material safety data sheets from company web sites, and usually without having to register the identity of the requester.

There are a number of academic web sites and commercial web sites that provide MSDSs. Some provide MSDSs without charge. Others make a nominal charge for each one. The following is a list with web addresses of the most popular of these sites:

- Vermont Safety Resources, Inc.: <http://siri.org/msds/index.php> - The “national MSDS site”. Also, <http://hazard.com> - A mirror of the SIRI site.
- Cornell University MSDS site: <http://msds.ehs.cornell.edu/msdssrch.asp>
- University of Kentucky Link site: <http://www.ilpi.com/msds/index.html>
- Kansas State University: <http://www.phys.ksu.edu/area/jrm/Safety/msds.html>
- Oxford University MSDS site: <http://physchem.ox.ac.uk/MSDS/>
- VWR Scientific Products <http://www.vwrsp.com/catalog/>
- Fisher Scientific: <https://www2.fishersci.com/chemical/info/msdsinfo.jsp>
- Sigma-Aldrich, <http://www.sigma-aldrich.com>
- MSDS Search - a national repository [www.msdssearch.com/msdssearch.htm](http://www.msdssearch.com/msdssearch.htm)
- Manufacturer-direct MSDS: [www.msdsprovider.net/Site/msdsprovider.nsf/about](http://www.msdsprovider.net/Site/msdsprovider.nsf/about)

## What are some Typical Applications?

Whether the forensic investigation and litigation involve exposure to a health hazard or a fire caused by improper chemical storage, the contents of material safety data sheets have direct relationships to a wide variety of other discoverable documents. Some of these include:

- Instruction and training materials for employees
- Instruction sheets for the consumer
- Labels and warnings on products
- Labels on raw materials and containers of work-in-process
- Laboratory notebooks (paper, microfilm and electronic)
- Manufacturing instructions and specifications
- Medical removal records
- Patents, including disclosures and applications
- Placards and other signage
- Plant engineering records
- Product development/improvement files
- Purchasing records for raw materials, personal protective equipment, etc.
- Quality control/quality assurance standards and specifications
- Customer complaints in Sales, Marketing or Technical Service Departments
- Regulatory agency citations
- Secrecy agreements
- Internal reports, memoranda and electronic communications
- Technical publications
- Premanufacturing Notifications (PMNs) to US EPA

## Quo Vadis and with whom?

Material safety data sheets are not, nor are they intended to be scholarly scientific documents. Much of their information on health effects, personal protective equipment, and first aid measures is meant to be understood by lay people. Nevertheless, the chemical and toxicological language is just that—chemical and toxicological. Moreover, locating a MSDS is one thing; getting the correct MSDS can be another. There may be several MSDSs available for a product or component, but not all would be pertinent to the matter. For example, an accident reconstruction involving exposure to formaldehyde could produce many different MSDSs along with related labels, placards, manufacturer's product data sheets, purchase orders, etc. A casual search of the SIRI web site ([www.hazard.com](http://www.hazard.com)) for formaldehyde produced 66 MSDSs and many of these were for substances that differed significantly from one another. Most were liquid solutions of formaldehyde in water and methyl alcohol. Some were solid powders of something called paraformaldehyde. The solutions ranged in concentration from 10% to 92%. Other differences involved the presence of other chemicals. Finally, several of the MSDSs were for substances that were not really formaldehyde.

The attorney will be served best by working with a forensic chemical specialist who can make the MSDS information pertinent to the circumstances of the incident, assess accuracy and

reliability, and along with other expert tasks, assist with the preparation of interrogatory and document production requests.

### **About the author**

Melvin R. Kantz, Ph.D., CHMM is a member of the professional staff of Consulting Engineers & Scientists, Inc. He manages the Long Beach CA office of this forensic consulting firm, which was established in 1969. Dr. Kantz is both a chemist and materials engineer with over thirty years of industrial product and process development and failure analysis experience with Monsanto, Shell, Congoleum and Ferro.

He consults with clients in matters involving workplace and consumer exposures to chemical and physical hazards, regulatory compliance, labels and warnings, slip, trip, and fall accidents, product liability, intellectual property and failure of non-metallic materials. Dr. Kantz holds positions as Adjunct Professor of Chemistry at El Camino College in Torrance, CA and at Los Angeles Harbor College in Wilmington, CA, and Adjunct Professor of Engineering at Mt. San Antonio College in Walnut, CA.

Dr. Kantz' additional credentials include Master level certification in Hazardous Materials Management (CHMM). He is a member of the American Chemical Society, the American Society of Safety Engineers, the Materials Research Society, and the Academy of Certified Hazardous Materials Managers. He co-founded and is the past president of the Southern California Chapter of the Academy of Certified Hazardous Materials Managers and he is also a member of the American Society for Testing and Materials (ASTM) Committee F13 on Safety and Traction of Footwear.

MSDS Safety Information

FSC: 7930
MSDS Date: 04/22/1992
MSDS Num: BXMRC
LIIN: 00F040924
Product ID: WINDEX GLASS CLEANER BLUE - RETAIL
MFN: 01
Responsible Party
Cage: DRACK
Name: DRACKETT PRODUCTS CO
Address: 8600 GOVERNORS HILL RD STE 300
City: CINCINNATI OH 45249-5000
Info Phone Number: 513-583-3900/800-242-1677
Emergency Phone Number: 513-583-3900/800-242-1677
Review Ind: Y
Published: Y

Preparer Co. when other than Responsible Party Co.

Cage: DRACK
Name: DRACKETT PRODUCTS CO
Address: 5020 SPRING GROVE AVE
City: CINCINNATI OH 45232-1988

Contractor Summary

Cage: 85234
Name: DRACKETT CO
Address: 5020 SPRING GROVE AVE
City: CINCINNATI OH 45232-1926
Phone: 513-632-7409
Cage: DRACK
Name: DRACKETT PRODUCTS CO
Address: 5020 SPRING GROVE AVE
City: CINCINNATI OH 45232-1988
Phone: 513-632-1500

Figure 1. MSDS for Drackett Products Co. Windex®- Blue Glass Cleaner that was downloaded from the SERI MSDS web site http://www.hazard.com

Ingredients

Cas: 67-63-0
RTECS #: NT8050000
Name: ISOPROPANOL (ISOPROPYL ALCOHOL), 2-PROPANOL, DIMETHYL CARBINOL
% Wt: <3
Other REC Limits: 400 PPM
OSHA PEL: 400 PPM
ACGIH TLV: 400 PPM
Cas: 111-76-2
RTECS #: KJ8575000
Name: 2-BUTOXYETHANOL (ETHYLENE GLYCOL MONOBUTYL ETHER), BUTYL CELLOSOLVE, BUTYL GLYCOL, GLYCOL ETHER EB
% Wt: <2
Other REC Limits: 25 PPM (SKIN)
OSHA PEL: 50 PPM (SKIN)
ACGIH TLV: 25 PPM (SKIN)

Health Hazards Data

Route Of Entry Inds - Inhalation: NO
Skin: NO
Ingestion: NO
Carcinogenicity Inds - NTP: NO
IARC: NO
OSHA: NO
Effects of Exposure: EYES: IRRITATION.
Explanation Of Carcinogenicity: NONE
Signs And Symptions Of Overexposure: SENSATION OF IRRITATION.
First Aid: EYES/SKIN: FLUSH W/WATER. INGESTION: DRINK MILK/WATER FREELY. OBTAIN MEDICAL ATTENTION IN ALL CASES.

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Handling and Disposal  
=====

Spill Release Procedures: FLUSH AREA W/WATER. KEEP OUT OF WATERSHEDS &  
WATER SYSTEMS.  
Waste Disposal Methods: DISPOSE OF IAW/FEDERAL, STATE & LOCAL REGULATIONS.  
Handling And Storage Precautions: UNPLUG ELECTRICAL APPLIANCES BEFORE USING  
PRODUCT ON THEM.  
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Fire and Explosion Hazard Information  
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Flash Point Method: SCC  
Flash Point Text: 129F  
Extinguishing Media: USE WATER, DRY ALCOHOL-TYPE/ALL PURPOSE FOAM, DRY  
CHEMICAL, CO2/OTHER CLASS B EXTINGUISHING AGENTS.  
Fire Fighting Procedures: WEAR FULL PROTECTIVE EQUIPMENT INCLUDING PRESSURE  
DEMAND SELF CONTAINED BREATHING APPARATUS & TURNOUT EQUIPMENT.  
Unusual Fire/Explosion Hazard: COMBUSTIBLE. KEEP AWAY FROM HEAT & FLAMES.  
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Control Measures  
=====

Physical/Chemical Properties  
=====

B.P. Text: 212F  
Vapor Pres: 17.6  
Vapor Density: 1.2  
Spec Gravity: 0.99  
PH: 11  
Evaporation Rate & Reference: (BU AC =1): 0.3  
Solubility in Water: COMPLETE  
Appearance and Odor: CLEAR BLUE LIQUID W/SLIGHT AMMONIA ODOR.  
=====

Reactivity Data  
=====

Stability Indicator: YES  
Stability Condition To Avoid: HEAT, FLAMES.  
Hazardous Polymerization Indicator: NO  
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Toxicological Information  
=====

Ecological Information  
=====

MSDS Transport Information  
=====

Regulatory Information  
=====

Other Information  
=====

HAZCOM Label  
=====

Product ID: WINDEX GLASS CLEANER BLUE - RETAIL  
Cage: DRACK  
Company Name: DRACKETT PRODUCTS CO  
Street: 5020 SPRING GROVE AVE  
City: CINCINNATI OH  
Zipcode: 45232-1988  
Health Emergency Phone: 513-583-3900/800-242-1677  
Label Required IND: Y  
Date Of Label Review: 12/16/1998  
Status Code: C  
Label Date: 12/16/1998  
Origination Code: G  
Hazard And Precautions: EYES: IRRITATION.

SENSATION OF IRRITATION.

