

ANSI Z400.1-2004

American National Standard

*for Hazardous Industrial Chemicals –
Material Safety Data Sheets –
Preparation*



This is a preview of "ANSI Z400.1-2004". [Click here to purchase the full version from the ANSI store.](#)

ANSI®
Z400.1-2004
Revision of
ANSI Z400.1-1998

American National Standard
for Hazardous Industrial Chemicals –

Material Safety Data Sheets – Preparation

Secretariat

American Chemistry Council

Approved March 31, 2004

American National Standards Institute, Inc.

American National Standard

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgement of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by

**American National Standards Institute, Inc.
25 West 43rd Street, New York, NY 10036**

Copyright © 2004 by American National Standards Institute, Inc.
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior written permission of the publisher.

Printed in the United States of America

Contents

	Page
Foreword	iv
Chapter 1 Scope and Purpose	1
1 Introduction	1
2 Scope, purpose and application	1
2.1 Scope	1
2.2 Purpose	2
2.3 Application	2
Chapter 2 Preparing an MSDS.....	3
1 General.....	5
2 MSDS organization.....	5
3 Appearance/communication principles	8
3.1 Appearance	8
3.2 Reading level and comprehension	9
4 General contents	10
4.1 Internal consistency	10
4.2 Review/preparation date.....	10
4.3 Units of measure	10
4.4 No blank data fields	11
4.5 Key/legend.....	11
4.6 Page and section numbers.....	11
4.7 Revision indicators	11
4.8 MSDS identifier.....	11
4.9 Disclaimer	12
4.10 Headers/footers	12
5 Hazard assessment.....	12
5.1 Collecting the information	12
5.2 Determining hazards	13
Chapter 3 Sections of an MSDS	15
1 Section 1: PRODUCT AND COMPANY IDENTIFICATION	17
2 Section 2: HAZARDS IDENTIFICATION.....	18
2.1 Emergency overview	18
2.2 OSHA regulatory status.....	19
2.3 Potential health effects	20
2.4 Potential environmental effects	21

	Page
3 Section 3: COMPOSITION/INFORMATION ON INGREDIENTS.....	23
4 Section 4: FIRST AID MEASURES	24
4.1 First aid procedures.....	24
4.2 Note to physicians	25
5 Section 5: FIRE FIGHTING MEASURES	26
5.1 Flammable properties.....	26
5.2 Extinguishing media	26
5.2.1 Suitable extinguishing media.....	26
5.2.2 Unsuitable extinguishing media.....	27
5.3 Protection of firefighters	27
5.3.1 Specific hazards arising from the chemical	27
5.3.2 Protective equipment and precautions for firefighters	28
6 Section 6: ACCIDENTAL RELEASE MEASURES	29
6.1 Personal precautions.....	29
6.2 Environmental precautions	29
6.3 Methods for containment.....	29
6.4 Methods for clean-up.....	29
6.5 Other information.....	30
7 Section 7: HANDLING AND STORAGE	31
7.1 Handling	31
7.2 Storage	32
8 Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION	33
8.1 Exposure guidelines	33
8.2 Engineering controls.....	34
8.3 Personal protective equipment (PPE)	34
8.3.1 Eye/face protection.....	35
8.3.2 Skin protection.....	35
8.3.3 Respiratory protection	35
8.3.4 General hygiene considerations.....	36
9 Section 9: PHYSICAL AND CHEMICAL PROPERTIES	37
10 Section 10: STABILITY AND REACTIVITY	39
10.1 Chemical stability	39
10.2 Conditions to avoid	39
10.3 Incompatible materials	39
10.4 Hazardous decomposition products	39

	Page
10.5 Possibility of hazardous reactions	40
11 Section 11: TOXICOLOGICAL INFORMATION	41
12 Section 12: ECOLOGICAL INFORMATION	45
13 Section 13: DISPOSAL CONSIDERATIONS	48
14 Section 14: TRANSPORT INFORMATION	50
14.1 Basic shipping information	50
14.2 Additional information	50
15 Section 15: REGULATORY INFORMATION	52
16 Section 16: OTHER INFORMATION	55
Chapter 4 Evaluating the completed MSDS	57
1 Format	59
2 Completeness	59
3 Internal consistency	59
4 Compliance	59
5 Appearance/communication principles	60
Chapter 5 References used to prepare this Standard	61
1 Regulatory/MSDS	63
2 General	63
Annexes	
A Summaries of regulatory data elements	65
A.1 Introduction	67
A.2 Data elements required for HCS	67
A.3 Data elements required under GHS	67
A.4 Data elements required for Canada's WHMIS	67
A.5 Data elements required for disclosure in EEC Safety Data Sheets	68
A.6 Data elements required for Mexico's NOM-114-STPS-1994	70
A.7 Data elements required for Japan's Guidelines	71
A.8 Data elements required for Australia's Guidelines	72
B MSDS Example	87
C Glossary	95
D Preparation Resources Document	119

Foreword (This foreword is not part of American National Standard ANSI Z400.1-2004.)

ANSI Z400.1-2004, *American National Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation* was developed by a technical committee of the American Chemistry Council (ACC) and was submitted for approval under ACC's ANSI-approved canvass method operating procedures.

The first *American National Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation*, ANSI Z400.1-1993, was developed in recognition of the need for guidance to help preparers of material safety data sheets (MSDSs) develop consistent and understandable documents that provide useful information to a variety of audiences. At that time, the standard introduced several items that had not been part of MSDSs in the past, including: the headings and order of the sections; the emergency overview; and sections 11 through 16.

The 1998 revision included: the addition of the OSHA product status; elements to improve consistency with international standards, internal consistency; and revisions of the annexes.

The 2004 revision includes the following significant changes:

- Improving hazard communication and aligning the Standard with the recommendations for safety data sheets in the Globally Harmonized System for Hazard Classification, Communication and Labeling (GHS) adopted by the United Nations in 2002;
- Improving readability and consistency and minimizing redundancy;
- Reordering the MSDS sections so Hazards Identification appears before Composition Information;
- Eliminating the option to list exposure guidelines in the Composition Information;
- Including a requirement that flammable properties appear in the physical and chemical properties section with an option to repeat them in the fire fighting measures section;
- Including required physical and chemical properties;
- Increasing consistency between the sections for Toxicological Information and Ecological Information, and including more complete and accurate lists of data types;
- Adding transportation elements that may be needed for transporting a chemical by various modes, to meet international regulations and for improved emergency response.

This standard contains 4 annexes, all of which are informative and are not considered part of the standard.

The following organizations, recognized as having an interest in the standardization of material safety data sheets, were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that an organization concurred with the version of the proposed standard submitted to ANSI.

Adhesive and Sealant Council, Inc.
Aerospace Industries Association
AFL-CIO
Air and Waste Management Association
Air Conditioning Contractors of America, Inc.
American Academy of Clinical Toxicology

American Association of Occupational Health Nurses
American Association of Poison Control Centers
American Chemical Society
American Dental Association.
American Electronics Association
American Feed Industry Association.
American Fiber Manufacturers Association
American Forest & Paper Association
American Industrial Hygiene Association
American Institute of Chemical Engineers (AIChE)
American Insurance Services Group
American Petroleum Institute
American Public Health Association
American Society of Safety Engineers
American Supply Association
American Trucking Associations
American Wood Preservers Institute
Argonne National Laboratory
Asphalt Roofing Manufacturers Association
ASTM E34.40 Hazard Communication Committee
Automotive Industry Action Group
Can Manufacturers Institute
Canadian Chemicals Producers Association
Canadian Labour Congress
Chemical Abstracts Service
Chemical Safety & Hazard Investigation Board
CIIT Centers for Health Research
Color Pigments Manufacturers Association
Compressed Gas Association
Consumer Specialties Product Association
Cosmetic, Toiletry & Fragrance Association
CropLife America
Data Interchange Standards Association
Defense General Supply Center
Edison Electric Institute
Environmental Protection Agency
ETAD North America
Flavor and Fragrance Specialties
FM Global
Graphic Arts Technical Foundation
Hazardous Materials Advisory Council
Independent Lubricant Manufacturers Association
Industry Canada
International Association of Fire Chiefs
International Association of Fire Fighters
International Chemical Workers Union Council
International Institute of Synthetic Rubber Producers
International Mass Retail Association
International Sanitary Supply Association
MDL Information Systems, Inc.
National Association of Chemical Distributors
National Association of Emergency Medical Technicians
National Association of Homebuilders
National Association of Printing Ink Manufacturers
National Association of Scientific Materials Managers
National Automobile Dealers Association
National Elevator Industry, Inc.
National Institute of Environmental Health Sciences
National Institute of Standards and Technology
National Lumber & Building Material Dealers Association
National Paint & Coatings Association
National Petrochemical & Refiners Association
National Safety Council
National Toxicology Program
National Wholesale Druggists' Association
Naval Supply Systems Command
North American Insulation Manufacturers Association
Organizational Resource Counselors

Pharmaceutical Research and Manufacturers of America
Printing Industries of America
Roof Coatings Manufacturers Association
Rubber Manufacturers Association
Screenprinting & Graphic Imaging Association International
Semiconductor Safety Association
Soap and Detergent Association
Society of American Florists
Society of the Plastics Industry
Sulphur Institute
Society of Toxicology
Synthetic Organic Chemical Manufacturers Association
The Weinberg Group
U.S. Consumer Product Safety Commission
U.S. Coast Guard
U.S. Dept. of Transportation
U.S. General Services Administration
United Steelworkers of America
WHMIS Division, Health Canada

The Working Group that developed this revision of the standard had the following members

Jayne Clifton, Chair
(Chevron Phillips Chemical Company)

Ali Basaran
(Eli Lilly and Company)
Edwin C. Bisinger
(Akzo Nobel Chemicals)
Susan Blanco
(American Chemistry
Council)
John D. Bruhnke
(Milliken Chemical)
Carl Carlin
(ATOFINA Chemicals)
Susan Conti
(Attorney-Consultant
for ACC)

Catherine Croke
(RohMax USA)
Stacie A. Eakin
(Lyondell Chemical)
Roger E. Etherington
(Vulcan Chemicals)
Wayne W. Henderson
(Bayer Corporation)
Michael Hulse
(Shell Chemical)
Roger Johnson
(Cognis Corporation)
Chun Man Lau
(Eastman Chemical)

Susan Martins
(PPG Industries)
Marlin McKinley
(Lubrizol)
David W. Peters
(Monsanto)
Janelle Restum
(Johnson Polymer)
Francis P. Rudy
(Air Products
& Chemicals)
Robert Skoglund
(3M)
Anne Stieffenhofer
(Eastman Kodak)

This is a preview of "ANSI Z400.1-2004". [Click here to purchase the full version from the ANSI store.](#)

Chapter 1

Scope and Purpose

This is a preview of "ANSI Z400.1-2004". [Click here to purchase the full version from the ANSI store.](#)

American National Standard for Hazardous Industrial Chemicals –

Material Safety Data Sheets – Preparation

1 Introduction

The development of new chemicals, the re-evaluation of existing chemicals and the ever-widening use of chemicals and chemical processes in a variety of applications have accentuated a need to provide information to people who use, handle or store hazardous industrial chemicals. As per the United States Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS), a Material Safety Data Sheet (MSDS) is one means of providing this information.

MSDSs are an important resource and provide a wide range of information. Details on material identity, manufacturer information, hazard identity, emergency information, instructions on what to do if a hazardous situation has occurred, information on the prevention of hazardous situations, as well as other technical information are contained in an MSDS. It is imperative that this information be provided in a manner that is accurate, clear and concise.

The HCS provides little information regarding the format of an MSDS. In 1993, the *American National Standard for Hazardous Industrial Chemicals – Material Safety Data Sheets – Preparation* was developed to address the need for an MSDS format that was comprehensive, understandable and consistent. A complete, logical and internally consistent MSDS is more likely to result from an orderly approach. This Standard is organized to present concepts and guidance to those involved in the preparation of MSDSs.

2 Scope, purpose and application

2.1 Scope

This Standard applies to the preparation of MSDSs for chemicals and materials¹ used under occupational conditions. It presents basic information on how to develop and write MSDSs that are complete, clear and consistent. It also identifies information that must be included to comply with the HCS. Additional information is provided to help comply with state and federal environmental and safety laws and regulations. With the addition of certain data elements, this Standard is also acceptable for international use. This Standard is not intended to address the distribution of MSDSs.

This Standard is not intended to provide a rote specification for complying with the HCS or any other government requirements. Requirements change. It is the responsibility of the MSDS preparer to be aware of current HCS requirements.

¹ OSHA requires that an MSDS be prepared for chemicals that are hazardous according to the criteria described in the HCS. This Standard recognizes that MSDSs may be prepared for nonhazardous chemicals as well as hazardous chemicals. This Standard uses the term, material, to denote this wider scope of coverage.