Understanding Chemical Hazards: Going Beyond Your SDS

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Toxics Use Reduction Institute
Fall 2022

TURI
TOXICS USE REDUCTION INSTITUTE
UMASS LOWELL

Workshop Objectives

1

Understand what an SDS is (and isn't)

2

Learn about hazard information resources

3

Learn how to approach the assessment of a product's or chemical's hazards

Welcome!

- Introduction poll
- Hazard basics
- SDS/GHS refresher
- Where do I find additional hazard information?
- How do I interpret it?
- Practice!

Hazard Evaluation and TUR Planning

- TUR planning – Is it TUR?
  - Comparing potential TUR options and substitute products/chemicals
  - Identifying opportunities for hazard reduction/elimination
- Alternative planning and screening for chemicals of concern
  - Opportunities for alternative planning on non-reportable chemicals
  - Investigating new materials/chemicals (DfE as alternative planning)
  - PFAS
  - Customers' restricted substances

Introduction Polls

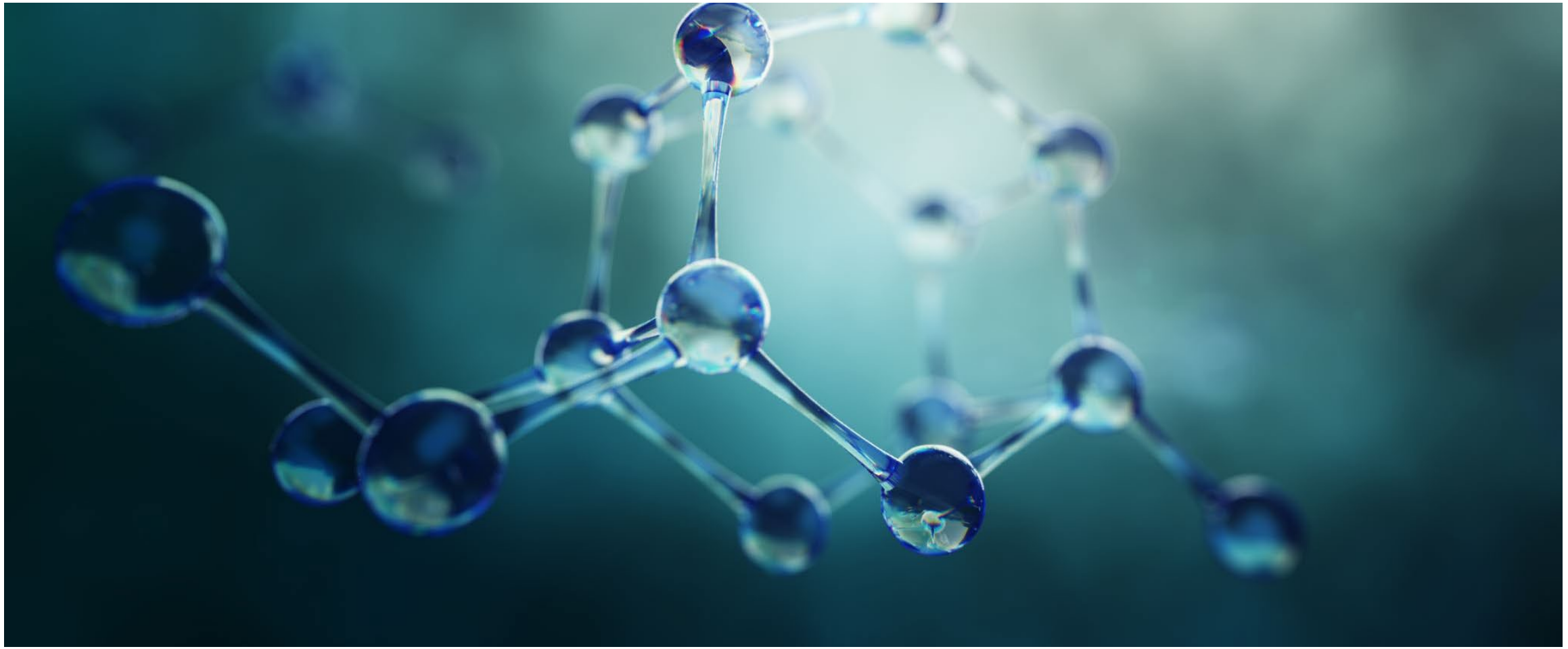
How familiar are you with GHS classes and categories?

- select all that apply

How familiar are you with hazard information?

- select all that apply

Part 1: Chemical Hazards and the Safety Data Sheet (SDS)



The Big Picture: Hazard Characterization

Human health hazards

i.e., carcinogenicity, eye corrosion, target organ toxicity

Physical hazards

i.e., flammable, metal corrosion, self-heating

Environmental hazards

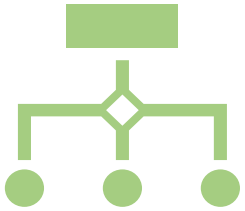
i.e., ozone depletion, aquatic toxicity

Health/Environmental Hazards: Acute vs Chronic

- Acute
  - Damage is immediate
  - i.e., eye/skin corrosion, respiratory irritation

- Chronic
  - Damage occurs over time following repeated exposures
  - i.e., carcinogens, sensitizers

Hazard Frameworks



Various systems exist for classifying hazards

Regulatory vs non-regulatory/decision-making

Specific to particular function or endpoint

Examples:

Hazcom/regulatory (US): GHS

Emergency response: NFPA, HMIS

Transport: DOT, IATA, IMDG; Waste: RCRA

Endpoints: Organizations such as AOEC, IARC, etc.

GreenScreen for Safer Chemicals

Certification systems – e.g., USEPA Safer Choice; Cradle to Cradle

Hazard Frameworks

- Terminology may be different
- Criteria may not be equivalent
- Endpoint may exist in one framework and not another
- Professional judgement/interpretation of data leads to different outcomes
- Numerical ratings may be opposite (is 1 good or bad?)
- Formulated products: Screening vs. weighted average

Hazard Framework - GHS

- Globally Harmonized System of Classification & Labeling
- Systematic approach to identifying and communicating chemical hazards
  - Criteria described in the UN Purple Book
- Required for hazcom in US (SDS, labels)

GHS

29 hazard classes; each with one or more categories

- Physical
- Health
- Environmental

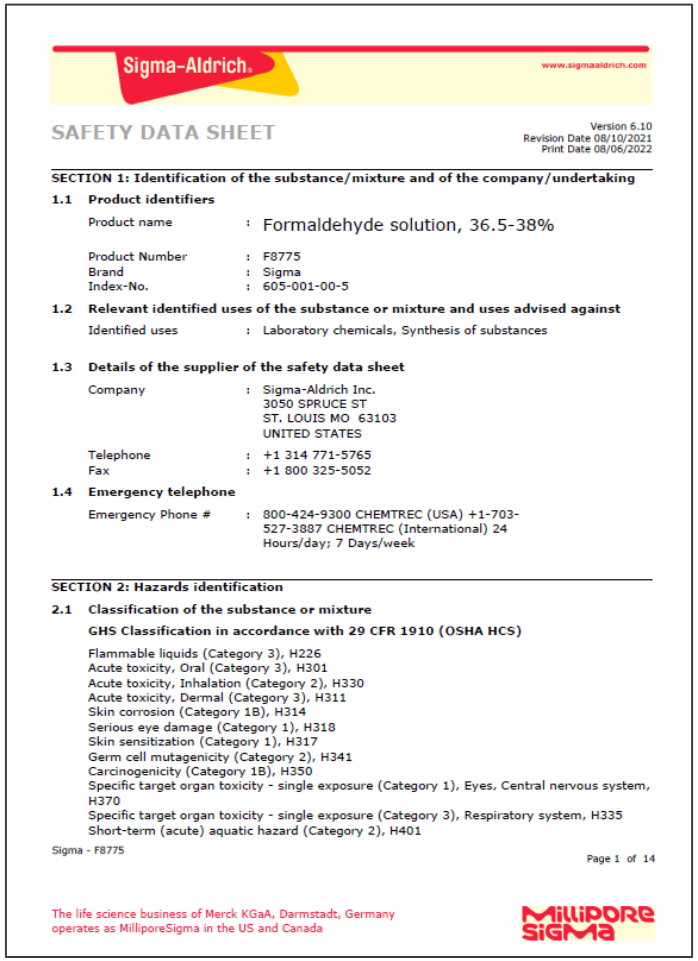
Category 1 = most severe

Section 2: Hazard ID/GHS

- Hazard class and category
  - E.g., **hazard class**: skin corrosion/irritation, **category** 2
- Pictogram(s)
- Signal word
  - WARNING or DANGER
- Hazard statements
  - E.g., H315 Causes skin irritation
- Precautionary statements
  - E.g., P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
  - P250 Do not subject to grinding/shock/friction
  - P420 Store away from other materials.

What is a safety data sheet (SDS)?

- Legal document developed by chemical manufacturers/ suppliers to comply with OSHA regulations (HazCom)
- SDS required for hazardous chemicals
- OSHA HazCom regs updated in 2012
  - Previously referred to as Material Safety Data Sheets (MSDS) (d. 2015)
  - Formalized SDS and label requirements
  - Adopted GHS



Sigma-Aldrich. www.sigmaaldrich.com

SAFETY DATA SHEET

Version 6.10
Revision Date 08/10/2021
Print Date 08/06/2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Formaldehyde solution, 36.5-38%

Product Number : F8775
Brand : Sigma
Index-No. : 605-001-00-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 1), Eyes, Central nervous system, H370
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Short-term (acute) aquatic hazard (Category 2), H401

Sigma - F8775

Page 1 of 14

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

MilliporeSigma

SDS Format

- **Section 1**: Product and company identification
- **Section 2**: Hazard(s) identification
- **Section 3**: Composition/information on ingredients
- **Section 4:** First-aid measures
- **Section 5**: Fire-fighting measures
- **Section 6**: Accidental release measures
- **Section 7**: Handling and storage
- **Section 8**: Exposure controls/personal protection
- **Section 9**: Physical and chemical properties
- **Section 10**: Stability and reactivity
- **Section 11**: Toxicological information
- **Section 12**: Ecological information
- **Section 13**: Disposal considerations
- **Section 14**: Transport information
- **Section 15**: Regulatory information
- **Section 16**: Other information

Sample SDS: formaldehyde solution

Sigma-Aldrich®

www.sigmaaldrich.com

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Sample SDS: formaldehyde solution – section 2

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Specific target organ toxicity - single exposure (Category 1), Eyes, Central nervous system, H370
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Short-term (acute) aquatic hazard (Category 2), H401

Comparison GHS and NFPA/HMIS – formaldehyde solution

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GHS

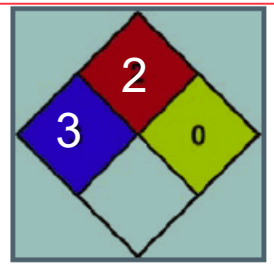
NFPA
HMIS

Formaldehyde, 37% w/w

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

NFPA health hazard	:	3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	:	2 - Must be moderately heated or exposed to relatively high temperature before ignition can occur.
NFPA reactivity	:	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health	:	3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	:	2 Moderate Hazard
Physical	:	0 Minimal Hazard
Personal Protection	:	H

Sample SDS: formaldehyde solution Section 2

- Flammables
- Acute toxicity
- Specific toxicity hazards
- Corrosives
- Irritants/sensitizers/other hazards

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H226	Flammable liquid and vapor.
H301 + H311	Toxic if swallowed or in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H370	Causes damage to organs (Eyes, Central nervous system).
H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge

Sample SDS: formaldehyde solution Section 3

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
formaldehyde			
CAS-No. EC-No. Index-No. Registration number	50-00-0 200-001-8 605-001-00-5 01-2119488953-20-XXXX	Flam. Liq. 4; Acute Tox. 3; Acute Tox. 2; Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Skin Sens. 1; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 2; H227, H301, H330, H311, H314, H318, H317, H341, H350, H335, H401 Concentration limits: >= 25 %: Skin Corr. 1B, H314; 5 - < 25 %: Eye Irrit. 2, H319; >= 5 %: STOT SE 3, H335; >= 0.2 %: Skin Sens. 1, H317; 5 - < 25 %: Skin Irrit. 2, H315; >= 25 %: Skin Corr. 1B, H314; 5 - < 25 %: Skin Irrit. 2, H315; 5 - < 25 %: Eye Irrit. 2, H319; >= 5 %: STOT SE 3, H335; >= 0.2 %: Skin Sens. 1, H317;	>= 30 - < 50 %
Methanol			
CAS-No. EC-No. Index-No. Registration number	67-56-1 200-659-6 603-001-00-X 01-2119433307-44-XXXX	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301, H331, H311, H370 Concentration limits: >= 10 %: STOT SE 1, H370; 3 - < 10 %: STOT SE 2, H371;	>= 10 - < 20 %

Sample SDS: formaldehyde solution Section 8

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
formaldehyde	50-00-0	TWA	0.1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Dermal Sensitization Respiratory sensitization Confirmed human carcinogen		
		STEL	0.3 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Dermal Sensitization Respiratory sensitization Confirmed human carcinogen		
		TWA	0.016 ppm	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		C	0.1 ppm	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		
		PEL	0.75 ppm	OSHA Specifically Regulated Chemicals/Carcinogens
		OSHA specifically regulated carcinogen		
		STEL	2 ppm	OSHA Specifically Regulated

Sample SDS: formaldehyde solution Section 9

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: clear
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	56.11 °C (133.00 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 73 %(V) Lower explosion limit: 7 %(V)
k)	Vapor pressure	69 hPa at 37 °C (99 °F)
l)	Vapor density	1.04 - (Air = 1.0)
m)	Density	1.09 g/cm3 at 20 °C (68 °F)
	Relative density	1.09 at 20 °C (68 °F)
n)	Water solubility	soluble

Sample SDS: formaldehyde solution Sections 10, 11

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive after 3 minutes to 1 hour of exposure - 20 h
(OECD Test Guideline 404)
Mixture causes burns.

Sample SDS: formaldehyde solution Section 15

SECTION 15: Regulatory information

SARA 302 Components

	CAS-No.	Revision Date
formaldehyde	50-00-0	2008-11-03

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
formaldehyde	50-00-0	2008-11-03
Methanol	67-56-1	2007-07-01

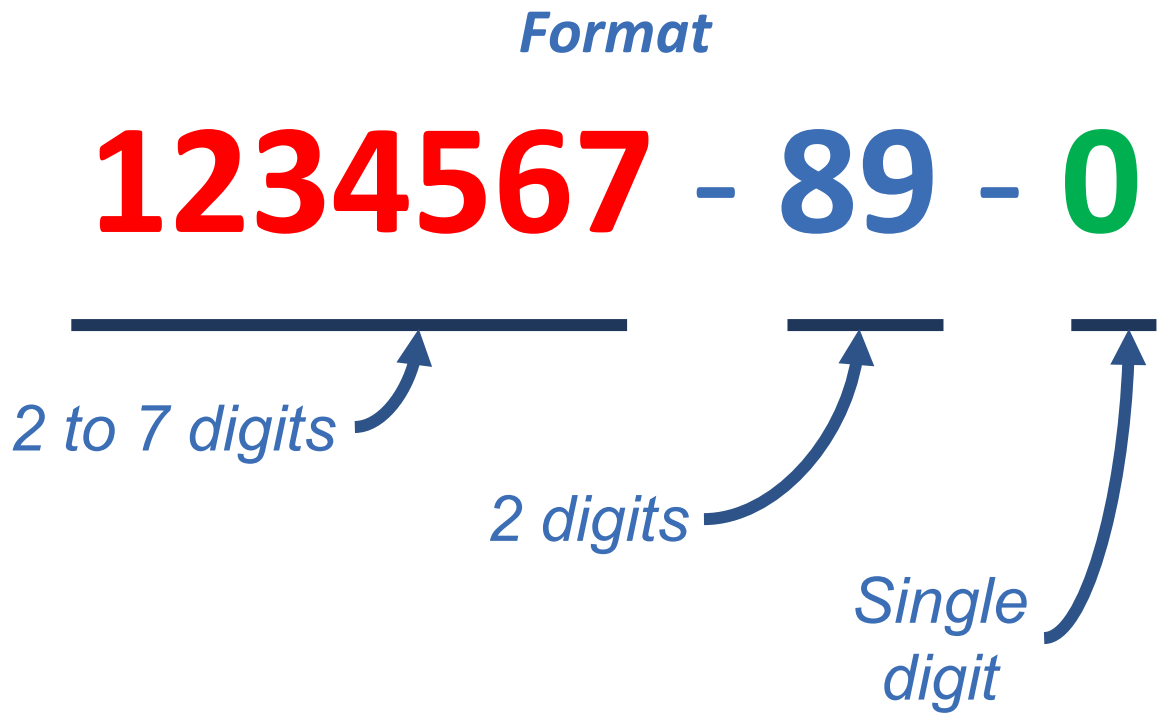
SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Section 3: Chemical Abstract Service (CAS)



Benefits of the SDS

- Provide basic product and company information
  - Mixture-specific info
- Arranged in standardized format
- GHS criteria is universal
- Aid workplace compliance efforts
- Essential to emergency situations
- A good set of basic information, and a starting point for further investigation

Limitations of the SDS

- Based on specific hazard criteria required by law
- GHS is self-classification system
- Age
- Quality
- May cover range of products
- Proprietary ingredients

Part 2: Approach and Resources for Chemical Hazard Information

Where to go next

- Recommend supplementing SDS with additional information when assessing chemical hazards

- TURI EHS resources guide
  - guides.turi.org/beyond_sds
    - “Beyond the SDS Training” tab for list of links we’ll use today

What additional information might I be looking for?

- Human Health
  - Neurotoxicity
  - Reproductive and developmental toxicity
  - Endocrine disruption
  - Sensitizers
- Environmental
  - Persistence
  - Mobility, fate and transport
  - Aquatic toxicity
  - Climate change and ozone depletion

Environmental, Health and Safety Data Resources: Home

This guide has been created to assist in researching environmental, health and safety information for chemicals.

Note: This site is in the process of being updated with current resources

General Information for Chemicals

These links take you to various pages for finding general, and sometimes detailed, information on chemicals including but not limited to physical properties, health effects, and environmental fate information. Links for finding general 'use' information are also included.

- PubChem - including Hazardous Substances Data Bank
  Site includes: Physical/Chemical Properties, Safety, Hazard & Toxicity data, Metabolism/Pharmacokinetics. Chemicals are searchable by Name, Synonym, CAS Registry Number, Molecular Formula, Structure, Toxicity, and/or Physical properties.
- Chemical Hazard and Alternatives Toolbox (ChemHAT)
  Symbolic representation of health effects of chemicals and the strength of those effects. Click on "data sources" to see references. Provides case studies of safer alternatives.
- National Institute for Occupational Health and Safety (NIOSH) Pocket Guide to Chemical Hazards
  Information about workplace chemicals and their hazards for workers, employers, and occupational health professionals.
- EPA's CompTox Chemicals Dashboard
  Includes chemical properties, environmental fate and transport, hazard, safety, exposure (use, biomonitoring), bioactivity data

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Tools for Organizing and Assessing EHS Information

- Pollution Prevention Options Analysis System (P2OASys)

  TURI developed the Pollution Prevention Options Analysis System tool to help companies and others organize information to compare the environmental, health and safety attributes of chemicals, formulated products and production process changes

- Roadmap for Finding Chemical Hazard Information

  Links to resources to help guide your process for finding the hazards associated with a chemical.

- Master Key of Abbreviations and Terms

  Abbreviations and terms used in this Library Guide are described in this document

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- PubChem - including Hazardous Substances Data Bank

  Site includes: Physical/Chemical Properties, Safety, Hazard & Toxicity data, Metabolism/Pharmacokinetics. Chemicals are searchable by Name, Synonym, CAS Registry Number, Molecular Formula, Structure, Toxicity, and/or Physical properties.

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  Symbolic representation of health effects of chemicals and the strength of those effects. Click on "data sources" to see references. Provides case studies of safer alternatives.

- National Institute for Occupational Health and Safety (NIOSH) Pocket Guide to Chemical Hazards

  Information about workplace chemicals and their hazards for workers, employers, and occupational health professionals.

- EPA's CompTox Chemicals Dashboard

  Includes chemical properties, environmental fate and transport, hazard, safety, exposure (use, biomonitoring), bioactivity data

guides.turi.org/beyond_sds

After reviewing a chemical manufacturer's safety data sheet (SDS), here are a few sites to begin your search for additional information.

- ChemHAT (Chemical Hazards and Alternatives Toolbox)

  ChemHAT provides a quick overview of chemical concerns that can supplement what you find in a product's safety data sheet.

- TURA list of toxic or hazardous substances
- Millipore Sigma (Sigma Aldrich) SDS

  Compare the manufacturer's SDS with one from another vendor, such as Millipore Sigma.

- PubChem

  NIH open database of chemical information. Includes many previously separate sources (e.g., HSDB, ToxNet, ChemIDplus)

- EU ECHA C&L Inventory

  ECHA maintains a library of harmonized and self-reported classifications of chemical substances imported and manufactured in EU.

- ECHA Information on Chemicals

  Search EU ECHA site for any information about a chemical

- CAMEO Chemicals

  Good source of information on physical properties of chemical substances.

- Web links and Acronym list

• Web links and Acronym list

Today's Resources

ChemHAT

- Based on government databases; a good overview of concerns

Chemical-specific current SDS

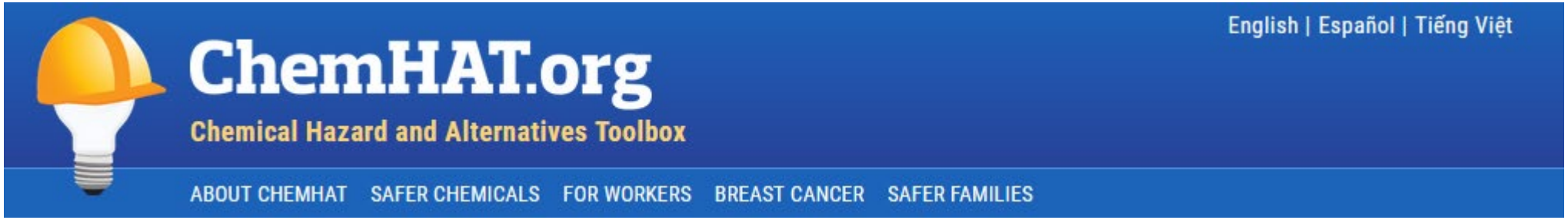
- Millipore, Sigma, Thermo Fisher Scientific

PubChem

- NIH NLM open database of chemical information.
- Now includes previously separate sources (HSDB, ToxNet, ChemIDplus, etc)
- Sources: government agencies, chemical vendors, journal publishers, and more.

TURA list of toxic or hazardous substances

- https://www.mass.gov/doc/complete-list-of-tura-chemicals-april-2022/download



Search suggestions

- Start typing the name or CAS number into the box and select from the available suggestions.
- If you don't know exactly what you are looking for, try searching on part of the chemical name, e.g. "methyl".
- To search by CAS number, be sure to include the dashes, e.g., 50-00-0.

https://chemhat.org/

English | Español | Tiếng Việt

ChemHAT.org

Chemical Hazard and Alternatives Toolbox

Search by material name or CAS #

ABOUT CHEMHAT | SAFER CHEMICALS | FOR WORKERS | BREAST CANCER | SAFER FAMILIES

Stronger effect / evidence — Weaker effect / evidence

Formaldehyde

CAS: 50-00-0

How can this chemical affect my health?

Acute (Short Term) Effects

Data sources

Toxic to Humans & Animals – Can be fatal on contact, ingestion or inhalation for humans and other mammals.

Irritates the Skin – Can cause irritation or serious damage to the skin.

Irritates the Eyes – Can cause irritation or serious damage to the eye.

Chronic (Long Term) Effects

Data sources

Asthma Trigger – Can result in high sensitivity so that small quantities trigger asthma, nose or sinus inflammation or other allergic reactions in the respiratory system.

Cancer – Can cause or increase the risk of cancer.

Sensitizes the Skin – Can lead to allergic reactions on the skin.

Gene Damage – Can cause or increase the rate of mutations, which are changes in genetic material in cells.

Endocrine Disruption – Can interfere with hormone communication between cells which controls metabolism, development, growth, reproduction and behavior (the endocrine system).

Birth Defects – Can cause harm to the developing child including birth defects, low birth weight and biological or behavioral problems that appear as the child grows.

Other Health Effects – Can cause serious damage on contact or ingestion.

Inherent Hazards

Data sources

Restricted List – This chemical is on a list from an authoritative body recommending that its use be avoided.

Flammable – Easily ignited and capable of burning rapidly.

How does this chemical impact the environment?

Data sources

Immediate Harm to Aquatic Ecosystems – A single exposure may result in severe biological harm or death to fish or other aquatic organisms.

Long-Term Harm to Aquatic Ecosystems – Long term exposure may result in irreversible harm to fish or other aquatic organisms.

Bioaccumulative – Accumulates in organisms, concentrating as it moves up the food chain.

Persistent – Does not break down readily from natural processes.

What safer alternatives are available for this chemical?

Find case studies related to substitutions for this chemical in SubsPORT, the substitution support portal.

How am I likely to be exposed to this chemical?

Ingestion

Skin contact

Inhalation

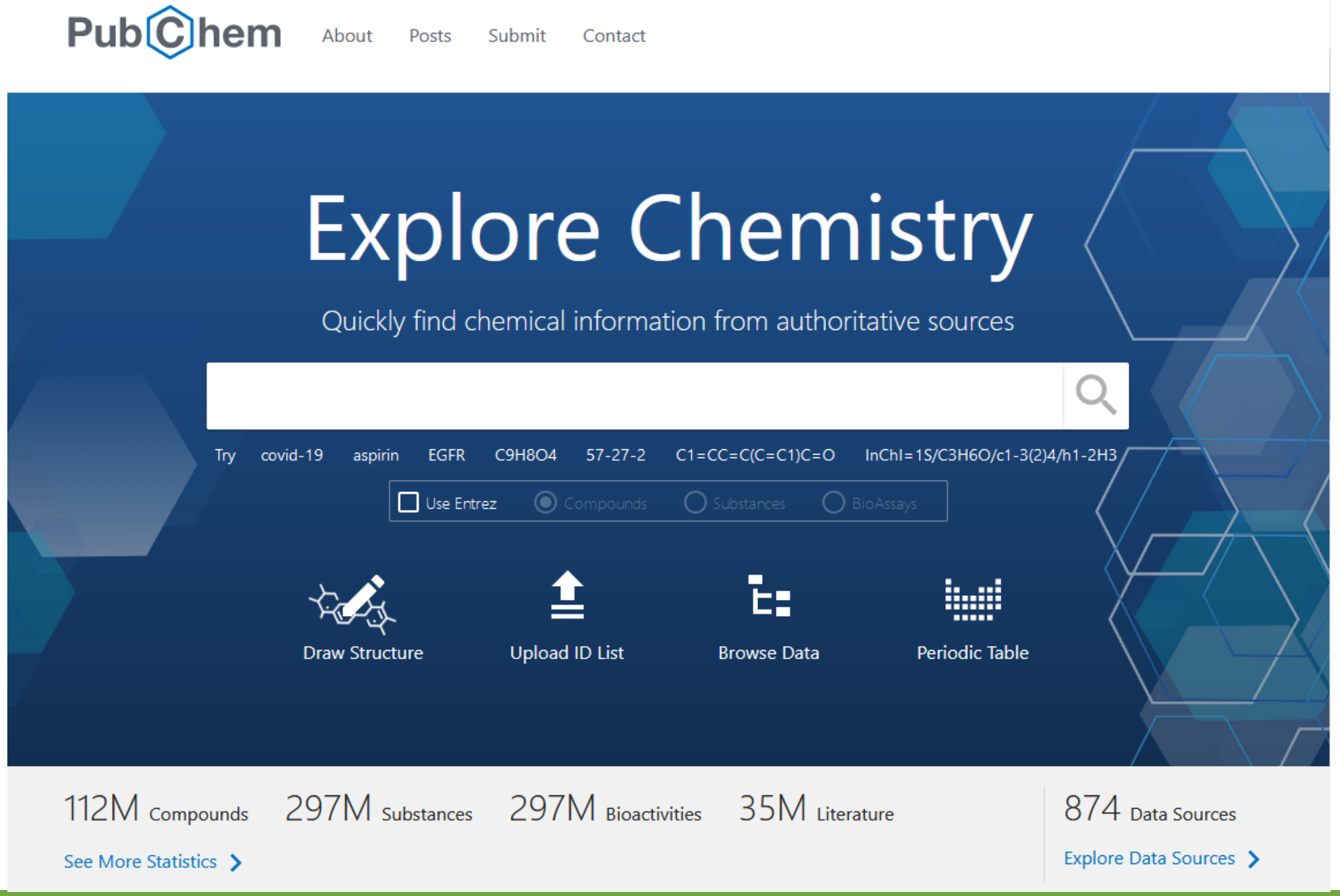
How can I protect myself from exposure to this chemical in the workplace?

Handle with gloves

Protective clothing

Respirator

ChemHAT.org Designed *for* workers *by* workers. | Contact Us


PubChem
About
Posts
Submit
Contact
Explore Chemistry
Quickly find chemical information from authoritative sources
Try
covid-19
aspirin
EGFR
C9H8O4
57-27-2
C1=CC=C(C=C1)C=O
InChI=1S/C3H6O/c1-3(2)4/h1-2H3
Use Entrez
Compounds
Substances
BioAssays
Draw Structure
Upload ID List
Browse Data
Periodic Table
112M Compounds
297M Substances
297M Bioactivities
35M Literature
See More Statistics
874 Data Sources
Explore Data Sources

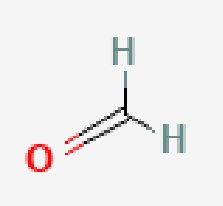
PubChem

https://pubchem.ncbi.nlm.nih.gov/

1 **Structures**
2 **Names and Identifiers**
3 **Chemical and Physical Properties**
4 Spectral Information
5 Related Records
6 Chemical Vendors
7 Drug and Medication Information
8 Food Additives and Ingredients
9 Agrochemical Information
10 Pharmacology and Biochemistry
11 **Use and Manufacturing**
12 Identification
13 **Safety and Hazards**
14 **Toxicity**
15 Associated Disorders and Diseases
16 Literature
17 Patents
18 Biomolecular Interactions and Pathways
19 Biological Test Results
20 Taxonomy
21 Classification
22 Information Sources

PubChem https://pubchem.ncbi.nlm.nih.gov/

1 Structures



2 Names and Identifiers

- E.g., DSSTox Substance ID from EPA Comptox database; synonyms incl some tradenames, ECHA numbers

3 Chemical and Physical Properties

- Molecular wt, solid/liquid/gas, odor, Boiling point, Flashpoint, solubility

11 Use and Manufacturing

- Industrial uses, some consumer uses (some information out of date) method of mfr,

13 Safety and Hazards

- GHS, EU SVHC, hazard summaries

14 Toxicity

- HSDB, ATSDR, NIOSH, etc.
- authoritative determinations, animal and epi study summaries

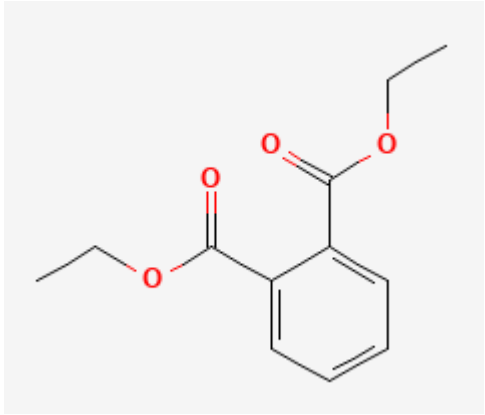
TURA list of Toxic or Hazardous Substances

MA TOXICS USE REDUCTION ACT - CURRENT CHEMICAL LIST -- Version April 2022 PBT = persistent bioaccumulative toxic chemical, HHS = higher hazard substance, LHS = lower hazard substance X = Reportable Chemical or Category, Q= TRI and TURA have different qualifiers, C = Reportable as Part of a Chemical Category ^ if chemical is included in a PBT Category, ! If chemical is included in an HHS Category									
Substance Name (delisted or stayed substances are struck out)	CAS # / DEP CODE	TRI Listed Substance	CERCLA Listed Substance	TURA - Only Listed Substance	PBT / HHS Threshold	PBT / HHS / LHS	De Minimis Concentration Threshold (1.0% if blank)	Qualifiers and Definitions	Changes to Reporting Requirements Over Time Reporting Year (RY) is the calendar year covered by the report
Formaldehyde	50000	X	X		1000 LBS	HHS	0.1%	Higher hazard substance. State Only Form R required. Submit separate Form R to EPA if Federal threshold exceeded. This chemical is an OSHA Carcinogen, the 0.1% de minimis threshold applies.	TURA Higher Hazard Chemical RY2012.

Recommended Resources for Understanding Chemical Hazards

Resource	Link	Chemical Information
PubChem	https://pubchem.ncbi.nlm.nih.gov	• Chemical structure • Synonyms • Chemical and physical properties • Safety and hazards • Toxicity • Use and manufacturing
ChemHAT	https://chemhat.org	• Acute and chronic effects • Authoritative lists of restrictions • Environmental impact; Persistence • Safer alternatives • Possible exposure routes • Recommended PPE
NIOSH Pocket Guide	www.cdc.gov/niosh/npg	• Target organs affected • Flashpoint • Exposure levels • Vapor pressure • Occupational health and safety focus
EU ECHA Registration	https://echa.europa.eu/en/web/guest/%20information-on-chemicals	• REACH registration dossiers • CLP (Classification, labelling and packaging) harmonized classifications
Source Lists	https://guides.turi.org/beyond_sds	• California Prop 65 • IARC • TURA chemical list • EU Substances of very high concern (SVHC) • ChemSec Substitute it Now (SIN) List

Activity 1



- Let's go through this together
- Example chemical:
  - Diethyl phthalate
  - CAS no. 84-66-2
  - *Plasticizer (added to polymers to effect flexibility and/or toughness); also used as an insect repellant and solvent; Used as a solvent in cellulose acetate, fragrances, and cosmetics; used in coatings, PVC compounds, adhesives*
- SDS
- ChemHAT

Links at: guides.turi.org/beyond_sds

Diethyl Phthalate SDS – Sigma Aldrich

- [1] Date?
- [2] Classification?
- [2] Precautionary Statements?
- [3] Composition?
- [9] Flash point?
- [9] Vapor pressure?
- [11] Toxicological concerns?
- [12] Ecological concerns?
- [15] Regulatory flags?

Diethyl Phthalate – use ChemHAT

- https://chemhat.org
- CAS # 84-66-2

Activity 2 – Fragrance for soaps and body washes

- Using a new fall scent – “brown sugar” by Wellington Fragrance
  - https://www.wellingtonfragrance.com/Fragrance-Oils/Traditional-Fragrance-Oils/Brown-Sugar-Fragrance-Oil
- Step 1: Read manufacturer SDS Is there missing information?
  - Areas of high concern due to use, releases, chemical ingredients?
- Step 2: Supplement GHS information from manufacturer
  - Look for other hazards outside the scope of GHS, or more detail on properties of concern
  - Sigma Aldrich SDS for particular ingredient
  - ChemHAT
  - PubChem
  - check the TURA chemical list

Part 3: Application and Wrap-up

Benefits of Going Beyond Manufacturer SDS

- More thorough review of hazards
- Become a critical consumer of information
- Learn where to find other sources of info
- Gain deeper understanding of hazards and criteria
- Keep in mind - Any single information source will have limitations
- Proprietary ingredients? - contact your supplier

Further assistance

TURI Library – physical/hard-copy resources

TURI online subscription tools

e.g., Pharos, UMass Lowell library scientific journals

Research assistance – contact info@turi.org

P2OASys - p2oasys.turi.org/

Great organizational tool for comparing hazards of alternatives

pre-populated hazard profiles as starting point

The Massachusetts Toxics Use Reduction Institute

www.turi.org

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