



Managing Exposure Assessments in the Workplace

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Exposure Assessment in the Workplace

- The risk that an employee faces on the job is a function of:
 - the hazards present and,
 - their exposure potential to those hazards
- Exposure assessment can be approached in many different ways
- Even resource constrained organizations can do this
- It's just a matter of getting started
- But.....
- What gets in the way?



Priorities.....





Other issues to manage.....





To begin with: OSHA General Duty Clause

(a) Each employer --

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act. 29 USC 654

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.



Managing Exposure Assessments in the Workplace

- Hazard recognition
 - Routine sources of information
 - Other sources of information
- Exposure Evaluation
 - Qualitative evaluation processes
 - Semi quantitative evaluations



Hazard Recognition

- Generally you have two sources
 - Supplier information
 - Labels
 - MSDSs
 - Internet resources



Hazard Recognition: Labels

- OSHA Label requirements are generic
 - Identity of hazardous chemicals
 - Appropriate hazard warning
 - Name & Address of mfr., importer, or other responsible party
- Common labeling systems
 - DOT
 - HMIS
 - NFPA
 - ANSI



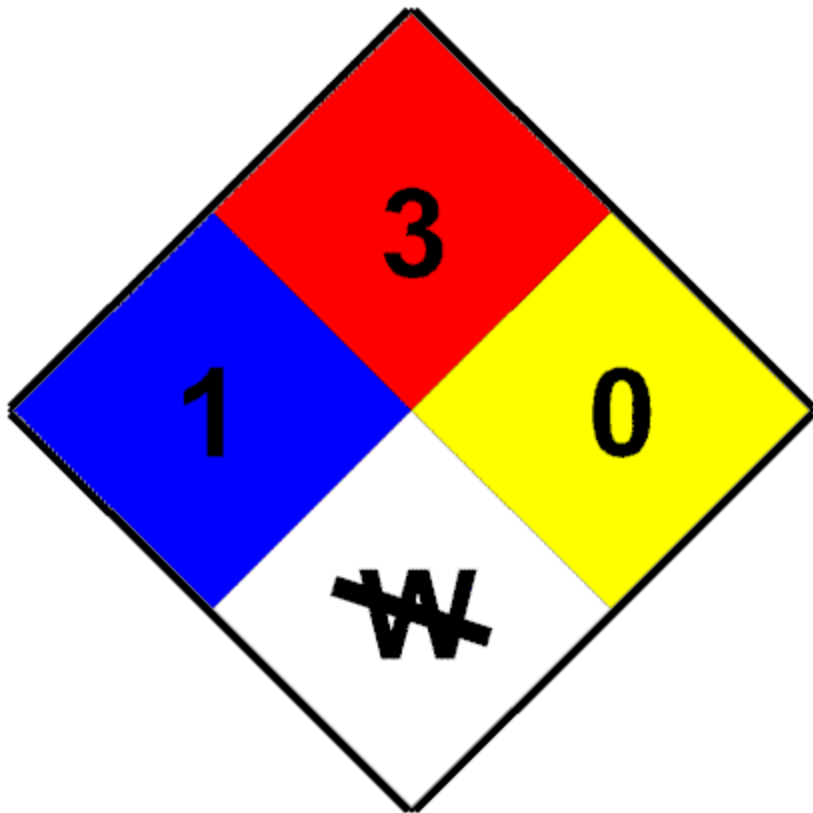
DOT Placards



- DOT poison criteria is limited
- Is presumed to be toxic to humans because it is within one of the following when tested on lab animals:
 - Oral toxicity: a material with an LD50 of ≤ 300 mg/kg.
 - Dermal toxicity: a material with an LD50 of ≤ 1000 mg/kg
 - Inhalation LC₅₀ at or below 4 mg/l (previously 10 mg/l) are considered toxic



NFPA



	Health
0	Material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible material.
1	Material that on exposure would cause irritation but only minor residual injury.
2	Material that on intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.
3	Material that on short exposure could cause serious temporary or residual injury.
4	Material that on very short exposure could cause death or major residual injury.



HMIS

HMIS Label

ACETONE	
1	Health
3	Flammability
0	Reactivity
C	Protective Equipment
HAZARD RATING	
4 EXTREME	1 SLIGHT
3 SERIOUS	0 MINIMAL
2 MODERATE	

- 0. **MINIMAL HAZARD:** poses no significant risk to health.
 - 1. **SLIGHT HAZARD:** causes irritation or minor, reversible injury on contact with eyes, skin, mucous membranes, or upper respiratory tract.
 - 2. **MODERATE HAZARD :**causes temporary or minor, reversible injury.
 - 3. **SERIOUS HAZARD :**causes major injury upon contact unless prompt remedial action is taken and medical treatment is given.
 - 4. **SEVERE HAZARD :**causes permanent tissue damage, major tissue damage, or may be life threatening upon a single exposure or with repeated exposures.
- []* **CHRONIC HEALTH EFFECTS** This material may cause chronic (long-term) health effects or may be carcinogenic (may cause cancer).




ANSI Label

- ANSI Z129.1 provides recommendations for:
 - chemical label format,
 - color,
 - size,
 - symbols,
 - wording: phrases

Plate-X Gold Plating Solution

DANGER !

May be fatal if swallowed, inhaled, or absorbed through the skin.



POISON

- † Do not breathe vapor or mist.
- † Do not get into eyes, on skin, or on clothing.
- † Exposure causes weakness, headache, cyanosis, loss of consciousness, respiratory arrest, or death.
- † Target organs - blood, metabolic enzymes, skin, lungs.
- † Physicians - treat exposure victims for cyanide poisoning.
- † Refer to Material Safety Data Sheet for additional information.

ABC Chemical Company
123 Hazard Drive
Anywhere, NY 13333
800-123-4567



GHS: What's It All About?





What is the GHS?

- Globally Harmonized System of Classification and Labeling of Chemicals
- A common approach to classifying hazards, and communicating information on labels and safety data sheets
- Target audiences include workers, consumers, transport workers, and emergency responders
- Provides the basis for establishment of national hazard communication regulations



Why is it needed?

- Companies must apply multiple classifications to chemicals around the world
- Multiple labels and safety data sheets for the same product are required in international trade.
 - Hazard dependent of origin and/or destination
- Consistent hazard communication and compliance is a challenge



Why?

Substance-oral toxicity LD50 = 257mg/kg



GHS

Danger (Skull & Cross Bones)

Transport

liquid, slightly toxic; solid: not classified

EU

Harmful (St. Andrew Cross)

US

Toxic

CAN

Toxic

Australia

Harmful

India

Non toxic

Japan

Toxic

Malaysia

Harmful

Thailand

Harmful

New Zealand

Hazardous

China

Not Dangerous

Korea

Toxic





Scope

- ***IMPACT ON:***
 - Criteria for Classification
 - Criteria and Content for Labeling
 - Content and format of MSDS's
 - Downstream Legislation Dependent on Hazard Classifications
- For the US we move from “appropriate hazard warning” to bright line classifications



GHS Acute Toxicity Criteria Example

Route	Unit	Cat. 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5**
Oral	mg/kg	≤ 5	≤ 50	≤ 300	≤ 2000	≤ 5000
Dermal	mg/kg	≤ 50	≤ 200	≤ 1000	≤ 2000	$\leq 5000^*$
Inhalation						
Gas	ppm	≤ 100	≤ 500	≤ 2500	≤ 5000	*
Vapour	mg/l/4h	≤ 0.5	≤ 2	≤ 10	≤ 20	*
Dust/Mist	mg/l/4h	≤ 0.05	≤ 0.5	≤ 1	≤ 5	*



GHS Impact: It's different

- For all the hard lesson is:
“Global harmonization doesn't mean the rest of the world does it like us”
- Agency diversity and conflicting areas of responsibility in the US
- OSHA has lead in workplace hazard communication
- EPA, CSPA, and others have pieces but have moved much slower to implement



GHS Impact: It's Different




- Training for all Regulatory/Compliance staff in the new system
- Training all plant workers in the new system
- Communicating with customers on new system through labels and MSDS's



GHS - NEW CRITERIA FOR CLASSIFICATION

Example Ethoxylated Alcohol

- Today Classified: R22 (Harmful if swallowed)
R41 (Risk of serious damage to eyes)
- Tomorrow Classified: Oral toxicity Category 4
Eye Irritation Category 1

EU CLASSIFICATION		GHS CLASSIFICATION	
Eye irritant	Risk of serious damage to eyes R41	Eye Irritant	Serious eye damage Cat. 1 DANGER
Acute Oral	Harmful if swallowed R22	Acute Oral	Acute toxicity Cat. 4 (Oral) WARNING
	Xn		
			



Hazard Recognition: MSDS Issues

- Content driven by compliance, liability concerns and “over warning” principles
- OSHA Hazard Communication Requirements “limit” data found on MSDS’s
 - Only hazardous material disclosure required per human health criteria
 - Specific data for health hazards not required: appropriate hazard warning is
- Control measures can be very generic
- Common practice in Industry to have 16 section MSDS with Toxicology section included
 - Qualitative hazard statements still very common
 - Examples
 - Slight irritant
 - Low toxicity
 - Not expected to present reproductive hazards
- Creates challenges for using in hazard/exposure assessment activities



MSDSs: All you need to know about any chemical

- Use with adequate ventilation
- Use suitable PPE when exposures are anticipated
- The choice of work glove depends on work conditions and what chemicals are handled
- Respiratory protection: Not normally required
- Store in suitable labeled containers
- Use good work and personal hygiene practices to avoid exposure
- Health Effects summary:
This stuff may be hazardous or not, the experts are undecided



Alternative sources of hazard Information

- Internet sources are many
- Finding the most credible and understandable is the trick
 - Google is a prolific and scary place
- Agency Sources (OSHA, NIOSH, etc.)
- Databases and Meta databases



<http://www.osha.gov/SLTC/healthguidelines/index.html>



UNITED STATES
DEPARTMENT OF LABOR

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<< [Back to Occupational Safety and Health Guidelines](#)

Occupational Safety and Health Guideline for n-Hexane

DISCLAIMER:

These guidelines were developed under contract using generally accepted secondary sources. The protocol used by the contractor for surveying these data sources was developed by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), and the Department of Energy (DOE). The information contained in these guidelines is intended for reference purposes only. None of the agencies have conducted a comprehensive check of the information and data contained in these sources. It provides a summary of information about chemicals that workers may be exposed to in their workplaces. The secondary sources used for supplements III and IV were published before 1992 and 1993, respectively, and for the remainder of the guidelines the secondary sources used were published before September 1996. This information may be superseded by new developments in the field of industrial hygiene. Therefore readers are advised to determine whether new information is available.



N-Hexane Example

Evaluation

HEALTH HAZARD INFORMATION

* Routes of Exposure

Exposure to n-hexane can occur through inhalation, ingestion, and eye or skin contact [Sittig 1991, p. 889].

* Summary of toxicology

1. Effects on Animals: n-Hexane is a neurotoxin, a narcotic, and an irritant of the eyes, skin, and mucous membranes [Hathaway et al. 1991]. n-Hexane also causes productive and embryotoxic effects and is cytotoxic in mammalian and human test systems [NIOSH 1991]. The oral LD(50) in rats is 28,710 mg/kg, and the lowest lethal concentration in mice is 120 g/m³ [NIOSH 1991]. Mice exposed to concentrations ranging from 1,000 to 2,000 ppm 24 hours/day for 6 days/week for 1 year developed atrophy and degeneration of hind leg muscle fibers [NLM 1992]. Mice exposed to 2,500 to 3,000 ppm n-hexane for 4 days developed liver enlargement within 24 hours of exposure onset [NLM 1992]. Rabbits exposed by inhalation to 3,000 ppm 8 hours/day for 8 days showed changes in the lungs, emphysema, necrosis of the bronchial epithelium, and atelectasis [NLM 1992]. Rats continuously exposed to 400 ppm developed anoxapathy, although intermittent exposure to 10,000 ppm 6 hours/day, 5 days/week for 13 weeks caused only mild paranodol axonal swelling [Hathaway et al. 1991]. The offspring of rats and mice exposed orally or by inhalation to n-hexane during gestation showed depressed weight gain after birth [Hathaway et al. 1991]. This agent also affects male and female reproductive capacity [Amdur 1991].

2. Effects on Humans: n-Hexane is a narcotic agent; an irritant to the eyes, upper respiratory tract, and skin; and a neurotoxin. Exposure of humans to 5,000 ppm n-hexane for 10 minutes causes marked vertigo; exposure to 1,500 ppm results in headache and slight nausea [Hathaway et al. 1991; Clayton and Clayton 1982]. In industrial settings, exposure to levels exceeding 1,000 ppm have been reported to cause mild symptoms of narcosis [Hathaway et al. 1991]. Eye and upper respiratory tract irritation has been reported to occur in humans exposed to 880 ppm n-hexane for 15 minutes [Clayton and Clayton 1982]. Dermal contact with n-hexane results in immediate irritation characterized by erythema and hyperemia; exposed subjects developed blisters 5 hours following dermal exposure to n-hexane [Hathaway et al. 1991]. The neuropathic toxicity of n-hexane in humans is well



N-Hexane Example

PERSONAL PROTECTIVE EQUIPMENT

Workers should use appropriate personal protective clothing and equipment that must be carefully selected, used, and maintained to be effective in preventing skin contact with n-hexane. The selection of the appropriate personal protective equipment (PPE) (e.g., gloves, sleeves, encapsulating suits) should be based on the extent of the worker's potential exposure to n-hexane. The resistance of various materials to permeation by n-hexane is shown below:

Material	Breakthrough time (hr)
Nitrile Rubber	>8
Polyvinyl Alcohol	>8
Teflon	>8
Viton	>8
4H (PE/EVAL)	>8
Chemrel	>8
Responder	>8
Barricade	>4
Trellchem	>4(*)
Butyl Rubber	<1(**)
Natural Rubber	<1(**)
Neoprene	<1(**)
Polyethylene	<1(**)
Polychloroethylene	<1(**)



eChemPortal: One Search Engine/ 23 Databases

- [ACToR](#)
U.S. EPA Aggregated Computational Toxicology Resource
- [AGRITOX](#)
AGRITOX - Base de données sur les substances actives phytopharmaceutiques
- [CCR](#)
Canadian Categorization Results
- [CCR DATA](#)
Canadian Categorization Results
- [CESAR](#)
Canada's Existing Substances Assessment Repository
- [CHRIP](#)
Information on Biodegradation and Bioconcentration of the Existing Chemical Substances in the Chemical Risk information platform (CHRIP)
- [ECHA CHEM](#)
European Chemicals Agency's Dissemination portal with information on chemical substances registered under REACH
- [EnviChem](#)
Data Bank of Environmental Properties of Chemicals
- [ESIS](#)
European Chemical Substances Information System (ESIS)
- [GHS-J](#)
The Result of the GHS Classification by the Japanese Government
- [HPVIS](#)
High Production Volume Information System (HPVIS)
- [HSDB](#)
Hazardous Substance Data Bank
- [HSNO CCID](#)
New Zealand Hazardous Substances and New Organisms Chemical Classification Information Database
- [INCHEM](#)
Chemical Safety Information from Intergovernmental Organizations - INCHEM
- [J-CHECK](#)
Japan CHEMicals Collaborative Knowledge database
- [JECDB](#)
Japan Existing Chemical Data Base
- [NICNAS PEC](#)
Australian National Industrial Chemicals Notification and Assessment Scheme (NICNAS) Priority Existing Chemical Assessment Reports
- [OECD HPV](#)
Organisation for Economic Cooperation and Development (OECD) Existing Chemicals Database



eChemPortal

Substance Search

Number:

CAS, EC, IUBMB, MITI, UN or NA Number.

Example: 108-88-3 for a CAS Number.

Make sure you include the number separators. Do not search on partial Numbers.

Chemical name or synonym:

Example: Use `gluta*` to find Glutamic acid, use `*chloro*` to find dichlorobenzene.

To search for `*` as character (non wildcard use) use `**` instead.

Databases:

- | | |
|---|--|
| <input checked="" type="checkbox"/> ACToR | <input checked="" type="checkbox"/> AGRITOX |
| <input checked="" type="checkbox"/> CCR | <input checked="" type="checkbox"/> CCR DATA |
| <input checked="" type="checkbox"/> CESAR | <input checked="" type="checkbox"/> CHRIP |
| <input checked="" type="checkbox"/> ECHA CHEM | <input checked="" type="checkbox"/> EnviChem |
| <input checked="" type="checkbox"/> ESIS | <input checked="" type="checkbox"/> GHS-J |
| <input checked="" type="checkbox"/> HPVIS | <input checked="" type="checkbox"/> HSDB |



Exposure Assessment: What's it all about?

- The risk that an employee faces on the job is a function of:
 - the hazards present and,
 - their exposure potential to those hazards
- Exposure assessment is the use of a systematic method to characterize workplace exposures to chemical, physical and biological agents
- Exposure assessment is a risk management tool!



Exposure Assessment: Why

- A documented characterization of employee exposures allows for a more effective risk management program
- This includes better focus for
 - compliance programs
 - training programs
 - purchase and implementation of control measures
 - improved execution of medical surveillance programs
 - valuable data for risk management programs including insurance and loss control
 - employee involvement and communication tool
 - basis for management of change



Exposure Assessment: Qualitative

- Exposure monitoring is not always required to assess exposures
 - Multiple “non monitoring” techniques developed and validated
- Modeling or computerized techniques have become more widely accepted
 - Driven by REACH in the last 3 years
- The key is having a transparent, thorough, and documented approach
- One advantage to qualitative process can be employee involvement at multiple levels



Getting Started: Prioritize Your Efforts

- List of all potentially hazardous materials used, stored, handled, or produced
- Volumes handled
- Number of employees involved in the handling/operations



Next Step: Information Collection

- Description of operation, task, or process, including:
 - work practices and procedures,
 - frequency and duration of operation
- Exposure controls in place for identified tasks
 - Operating procedures
 - PPE procedures
 - Engineering controls in place
- Applicable exposure limits/hazard level indicators
- Release potential
 - Dustiness
 - Volatility
- Any past incidents or health allegations from the chemical or operation



Putting It All Together: One approach for ranking

- **Health Hazard Rating**

- (1) Highly serious /extremely toxic life threatening, non-reversible effects from exposure characterized by acute lethal toxicity, non-reversible chronic cumulative systemic effects, known human carcinogens (OSHA, IARC, NTP listed), or reproductive hazards.
- (2) Serious but not immediately (acutely) life threatening, or non-reversible consequences from exposure characterized by acute systemic effects (i.e. respiratory, CNS, kidneys, liver, heart), corrosives, chronic system effects, suspect human or animal carcinogen, mutagen or teratogen.
- (3) More serious but not life threatening effects from exposure characterized by marked irritation, chemical asphyxiants, or CNS depressants.
- (4) Minor temporary or reversible effects from excess exposure characterized by mild to moderate irritants, simple asphyxiants, or odorous materials.

- **Frequency**

- (1) More than once per day
- (2) More than once per week
- (3) Less than once per week
- (4) Less than once per month



Putting It All Together: Ranking

- **Duration**

- (1) >4hrs (8 hr shift) or >6 hrs (12 hr shift)
- (2) 2-4 hrs (8 hr shift) or 3-6 hrs (12 hr shift)
- (3) 1-2 hrs (8 hr shift) or 1.5-3 hrs (12 hr shift)
- (4) <1 hr (8 hr shift) or <1.5 hrs (12 hr shift)

- **Controls Rating**

- (1) No controls (engineering or administrative)
- (2) Engineering and/or administrative controls in place, effectiveness unknown
- (3) Administrative controls in place, proven effective
- (4) Engineering and administrative controls in place, proven effective



Putting It All Together: Results and Actions

- **Exposure Rating: (*Health Hazard Rating + Frequency Rating + Duration Rating + Controls Rating*)**
 - If sum 4 or less, determine and implement control methods then conduct baseline monitoring to determine effectiveness.
 - If sum = 5-8, conduct baseline monitoring to determine effectiveness and determine further action if necessary. If IH data proves that controls are effective but Exposure Rating still scores a "2", include this task on periodic monitoring schedule. Options for engineering controls should be investigated if none are present.
 - If sum = 9-12, no further action required unless employee concern or incident involving employee exposure.
 - If sum = 13-16 or less, no further action required.



Control Banding

- Concept developed in the UK by the HSE to assist industry in exposure control
- Designed to be implemented by employers with limited resources
- The employer uses a short checklist to develop a control scheme based on qualitative exposure assessment
 - Focus is controls rather than measurements
- Can be applied to substances w/or w/out exposure limits
- Specific activity exposure control sheets then available for application



Control Banding Precepts

- Most substances can be grouped into four health hazard bands
 - UK process based on “R” phrases
- Each band can be assigned a target maximum exposure that should not be exceeded
- Exposure potential is primarily a function of quantity used, dustiness/volatility, and the level of control in place
- Most facilities use similar unit operations
- Controls can be assigned based on the above




Information Required

- COSHH ESSENTIALS RISK ASS'T APPROACH
 - Identify Type of Task
 - Identify Assigned Chemical Hazard Band (A - E)
 - Determine Volatility (3 Levels) or Dustiness (3 Levels)
 - Amount of Chemical Used in the Task (3 Levels)
 - Control Solutions or IH Expertise Output as Necessary

[UK HSE Control Banding](#)



Control Banding




Health & Safety Executive
Reducing risks,
protecting people

COSHH ESSENTIALS

Easy steps to control health risks from chemicals hsedirect

- Home
- About COSHH Essentials
- Help
- Worked Example
- HSE
- hsedirect
- DTI Small Business Service
- Environment Agencies



COSHH ESSENTIALS

Easy steps to control health risks from chemicals.

- ✓ COSHH Essentials provides advice on controlling the use of chemicals for a range of common tasks, eg mixing, or drying. Click [here](#) for an example of the type of advice you will receive.
- ✓ For most tasks this website will take you through a number of steps and ask for information about your tasks and chemicals. This assessment will take several minutes to complete.
- ✓ But for some processes, tasks or services you can now get direct advice. Click [here](#) for an example of the type of advice you will receive.

[Click here to get started](#)



Input Data Elements

COSHH ESSENTIALS - Windows Internet Explorer

http://www.coshh-essentials.org.uk/shtml/WorkedExample8.htm

Congratulations! You have completed the COSHH Essentials risk assessment for 1 chemical. Below is a summary of the information you have input.

If you think you have made a mistake or you wish to change any of the information, please click [here](#) to edit the information on this task.






To obtain more details on the summary, click on any of the terms below.

Chemical or product name :	citox
R-phrases :	R21/22, R36/37/38
State :	Liquid
Operating temperature :	25 °C
Boiling point :	134 °C
Hazard group :	C
Skin hazard :	Yes
Quantity used :	Medium
How many times a day ?	2 times a day
How long does the task take ?	120 minutes



Control Advice

Recommended control approach : **Containment**

Task Name	Guidance Sheet Title	Number	Download
General tasks	Containment	G300	
Transferring	Drum filling	G305	
Transferring	Drum emptying	G306	
Transferring	Transferring liquid by pump	G312	
Transferring	Bottle filling	G314	

Your task involves **Chemicals causing harm via skin contact**. Hence the following Guidance Sheets are also recommended

Task Name	Guidance Sheet Title	Number	Download
General	General advice	S100	
General	Selection of personal protective equipment	S101	



Task Specific Control Guidance



Control approach 3

Control guidance sheet 318

Mixing (liquids)

318

Containment



This guidance sheet is aimed at employers to help them comply with the requirements of the Control of Substances Hazardous to Health Regulations 2002 (COSHH) by controlling exposure to chemicals and protecting workers' health.

The sheet is part of the HSE guidance pack *COSHH essentials: easy steps to control chemicals*. It can be used where the guide recommends control approach 3 (containment) as the suitable approach for your chemical(s) and task(s).

This sheet provides good practice advice on mixing medium and large quantities of liquids. It describes the key points you need to follow to reduce exposure to an adequate level.

It is important that all the points are followed.

Some chemicals can also be flammable or corrosive. Where they are, your controls must be suitable for those hazards too. Look at the safety data

Access

- ✓ Control staff entry to the work area.
- ✓ The work area and equipment should be clearly labelled.

Design and equipment

- ✓ The mixer should be fully enclosed and provided with effective seals on the lid, other access points and mixer drive shafts.
- ✓ Ensure the mixer is adequately vented to prevent pressure build-up.
- ✓ The mixer should be provided with liquid level and pressure indicators that are clearly visible.
- ✓ Consider the use of pressure relief valves and/or bursting discs for reactive materials.
- ✗ Do not allow entry to a closed mixer for cleaning or maintenance until the equipment has been isolated, made safe and the atmosphere checked for oxygen deficiency or toxic gases.
- ✓ Design the closed system to allow easy





Quantitative Exposure Modeling

- Mostly free applications
- EPA Exposure Assessment Tools

[epa exposure tools](#)

- ECETOC TRA

[ECETOC Worker Assessment](#)

- EKMG Workplace Exposure Estimates

[EKMG Worker Assessment Tool](#)



EPA ChemSTEER

What Does ChemSTEER Do ?

- . Estimates occupational inhalation and dermal exposure to a chemical during industrial and commercial manufacturing, processing, and use operations involving the chemical.
- . Estimates releases of a chemical to air, water, and land that are associated with industrial and commercial manufacturing, processing, and use of the chemical.

How Does ChemSTEER Work ?

. Allows users to select predefined industry-specific or chemical functional use-specific profiles or user-defined manufacturing, processing and use operations. Using these operations and several chemical-specific and case-specific parameters and general models, the ChemSTEER computer program estimates releases and occupational exposures. The methods in ChemSTEER were developed by the EPA Office of Pollution Prevention and Toxics (OPPT); Economics, Exposure, and Technology Division; Chemical Engineering Branch.



EPA ChemSTEER

What Do I Need to Use ChemSTEER ?

- . Understanding of processes (for operations without industry-specific data) and of ChemSTEER methods (in HELP screens).
- . Data and information on a chemical's:
 - . Physical-chemical properties, including molecular weight, vapor pressure, and density.
 - . Production or use volume, and if applicable, fractions devoted to multiple uses.
 - . Weight fractions and physical states.
- . Case-specific parameters, when available:
 - . Numbers of sites, operating days, and workers; batch amounts and durations.
 - . Release sources and worker activities.
 - . Workplace concentrations and release amounts and media.
 - . Types and sizes of containers used to transport the chemical or mixture.

How Are ChemSTEER Data Used ?

- . EPA's OPPT uses ChemSTEER methods in screening new and existing chemicals for the potential risk they may pose to workers and the environment.
- . ChemSTEER outputs can be used to identify potential pollution prevention and exposure reduction opportunities.



ECETOC TRA Worker Exposure Tool

ECETOC - Worker Exposure Tool - User guide - Windows Internet Explorer

http://www.ecetoc.org/worker-exposure-tool-user-guide

File Edit View Favorites Tools Help

Home / Activities / Targeted Risk Assessment (TRA) / Worker Exposure Tool - User guide

Worker Exposure Tool - User guide

V 2.0

INTRODUCTION

The ECETOC TRA Worker tool is available as a stand-alone tool (Excel spreadsheet). It allows the user to calculate predictions for inhalatory and dermal exposure (Tier 1 level) for the benefit of performing Chemical Safety Assessments. For more information on the background, the underlying science and the structure of the tool refer to the ECETOC Technical Report No. 93 and addendum to it, Technical Report No. 107.

OPENING THE TOOL

Upon opening the tool the user will be presented with a Security Warning.

Click on 'Enable Macros'. The tools opens with showing the input module.

At the bottom of the screen the tabs indicate the worksheets in the tool (Input

Done

Internet | Protected Mode: On

4:28 PM
8/24/2011



EKMG

Exposure estimate at the workplace

EMKG-EXPO-TOOL



The EMKG-EXPO-TOOL is part of the "Easy-to-use workplace control scheme for hazardous substances" (EMKG "Einfaches Maßnahmenkonzept für Gefahrstoffe") of the Federal Institute for Occupational Safety and Health (BAuA). Within the context of REACH the BAuA-Unit 4.1 -Occupational Exposure- offers an IT-tool free of charge for a first exposure estimate at the workplace. This Tier 1 assessment is **only valid for inhalation exposure**.

Before getting started please consider the limitations of the tool:

The EMKG-EXPO-TOOL is currently not appropriate for special situations, including activities where dusts are formed through abrasive techniques, open spray applications, gases, and pesticides. Operations that give rise to the generation of fumes (soldering, welding) and wood dusts are exempted as well. The tool is also not suited for CMR substances. These situations involve more complex exposures requiring additional considerations that are not yet fully addressed by the current tool. In addition, the tool does not cover safety hazards, environmental issues, or ergonomic issues.

System requirements: MS Excel 97 or later version (MS Excel 2002 has not been tested yet).



EMKG Process

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	EMKG - Exposure assessment part for liquids																															
2																																
3	Definition of volatility bands ?																															
4	Band	At normal temperature (~20°C)	Operating temp. (o.t.)	Vapour pressure (kPa at o.t.)																							Alternative input of ?					
5	Low	boiling point above 150°C	b.p. $\geq 5 \times \text{o.t.} + 50$	< 0.5																							boiling point [°C] and operating temperature					
6	Medium	boiling point between 50 and 150°C	other cases	0.5 - 25																							[°C]					
7	High	boiling point below 50°C	b.p. $\leq 2 \times \text{o.t.} + 10$	> 25																							input b.p.	input o.t.				
8																																
9	Scale of use bands ?																															
10	Band	Description																								Short term exposure ?		Applications on surfaces > 1m² ?				
11	Small	millilitres up to 1 litre for liquids																								Activity < 15 min. during a full 8 h shift?		e.g. painting, applying adhesives etc. and more than 1 litre product used per shift!				
12	Medium	litres (batch sizes between 1 and 1000 litres for liquids)																														
13	Large	cubic metres (batch sizes of greater than 1 m ³ for liquids)																								Yes	No	Yes	No			
14																																
15	Control strategies ?																															
16	Control Approach	Type	Description																													
17	1	General ventilation	Good general ventilation and good work practice																													
18	2	Engineering control	Local exhaust ventilation (e.g. single point extract, partial enclosure, not complete containment) and good work practice																													
19	3	Containment	Enclosed, but small breaches may be acceptable. Good work practice.																													
20																																
21	Exposure potential bands (EP)																															
22	Solids – EP band	Use band	Volatility band	Description																												
23	1	Small	Low	Millilitres of low volatility liquid																												
24	2	Small	Medium or High	Millilitres of medium / high volatility liquid, litres / cubic metres of low volatility liquid																												
25		Medium or Large	Low	cubic metres of low volatility liquid																												
26	3	Large	Medium	Cubic metres of medium volatility liquid, litres of medium / high volatility liquid																												
27		Medium	Medium or High																													
28	4	Large	High	Cubic metres of high volatility liquid																												
29																																
30	Predicted exposure ranges: Liquids																															
31	Control Approach	Predicted exposure level for vapour, ppm																														
32		Solids EP Band 1		Solids EP Band 2		Solids EP Band 3		Solids EP Band 4																								
33		(mL of low VP liquid)		(mL of med. / high VP liquid or L / m ³ of low VP liquid)		(m ³ of med. VP liquid or L of med. / high VP liquid)		(m ³ of high VP liquid)																								
34		1	< 5		5 - 50		50 - 500		> 500																							
35	2	< 0.5		0.5 - 5		5 - 50		5 - 500																								
36	3	< 0.05		0.05 - 0.5		0.5 - 5		0.5 - 5																								



In Conclusion

- It's the right thing to do
- A documented exposure assessment can bring many benefits
- There are multiple accepted methods that can be used for qualitative/quantitative evaluations.....
- Or to use as the basis for developing an internal process
- Employee involvement can bring many benefits
- If this fails call an Industrial Hygienist!

- Taxi please.....