

NIOSH OCCUPATIONAL EXPOSURE BANDING: A NEW TOOL FOR EVALUATING CHEMICAL HAZARDS

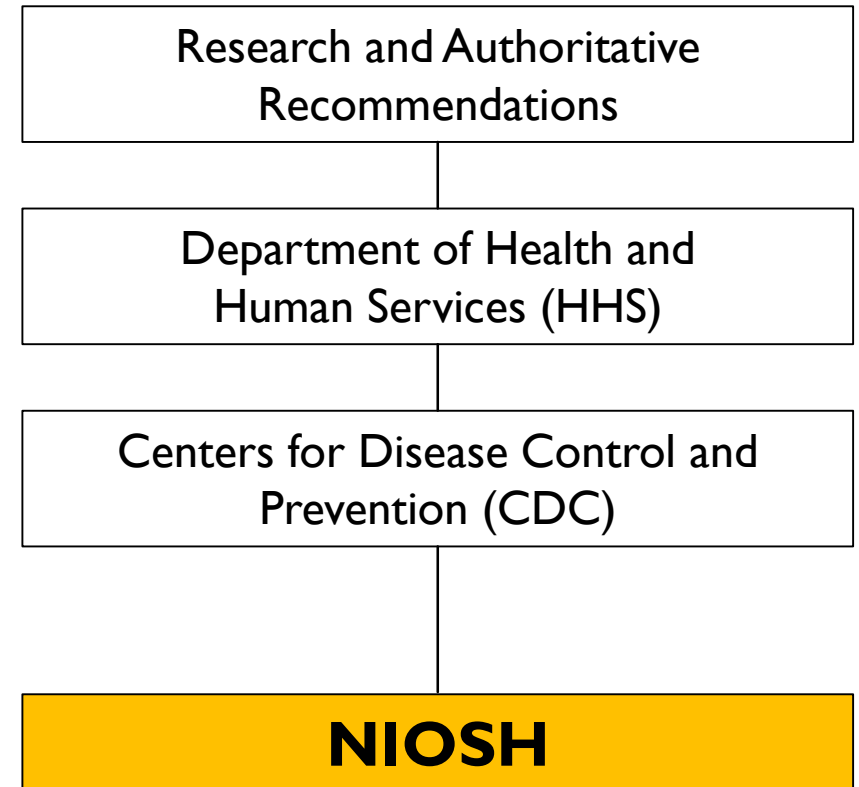
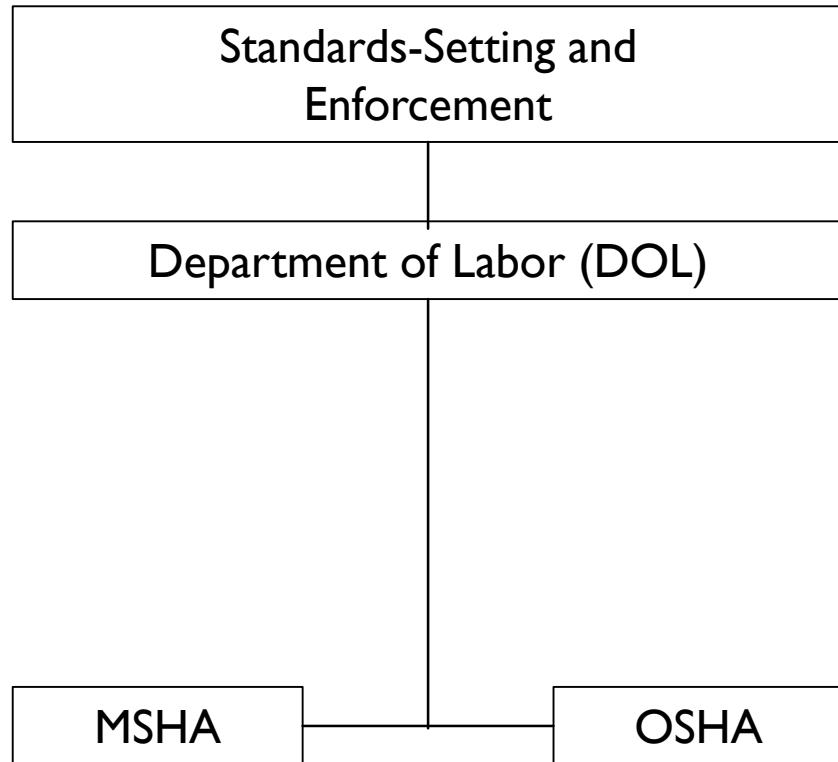
LT MELISSA SEATON, M.S.

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CENTERS FOR DISEASE CONTROL AND PREVENTION



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OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970



DOCUMENT OBJECTIVE

To create a consistent and documented process to characterize chemical hazards so timely and well-informed risk management decisions can be made for chemicals lacking OELs.



IMPORTANT POINT

An OEB is not meant to replace an OEL, rather it serves as a starting point to inform risk management decisions.

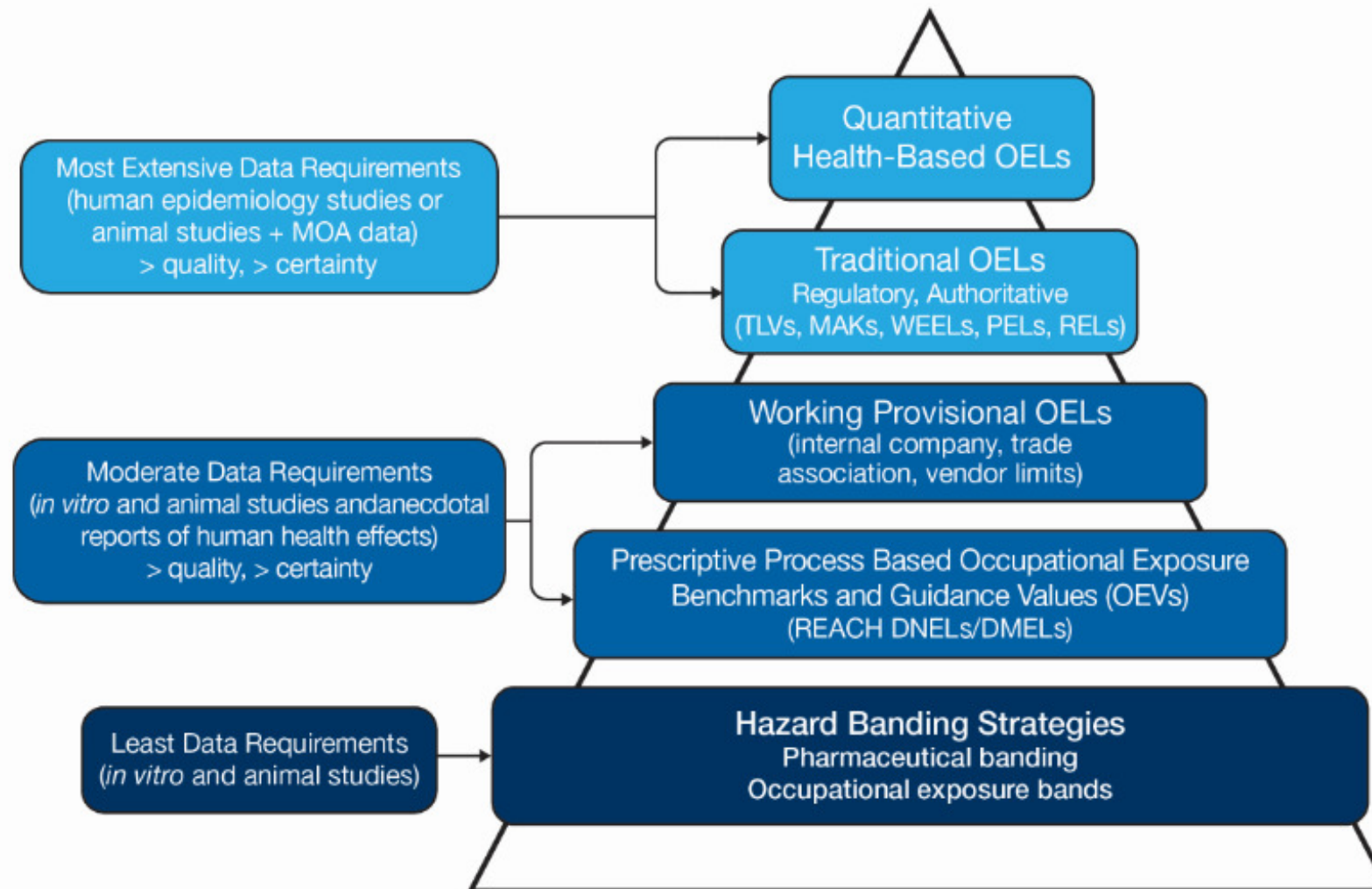


HISTORY

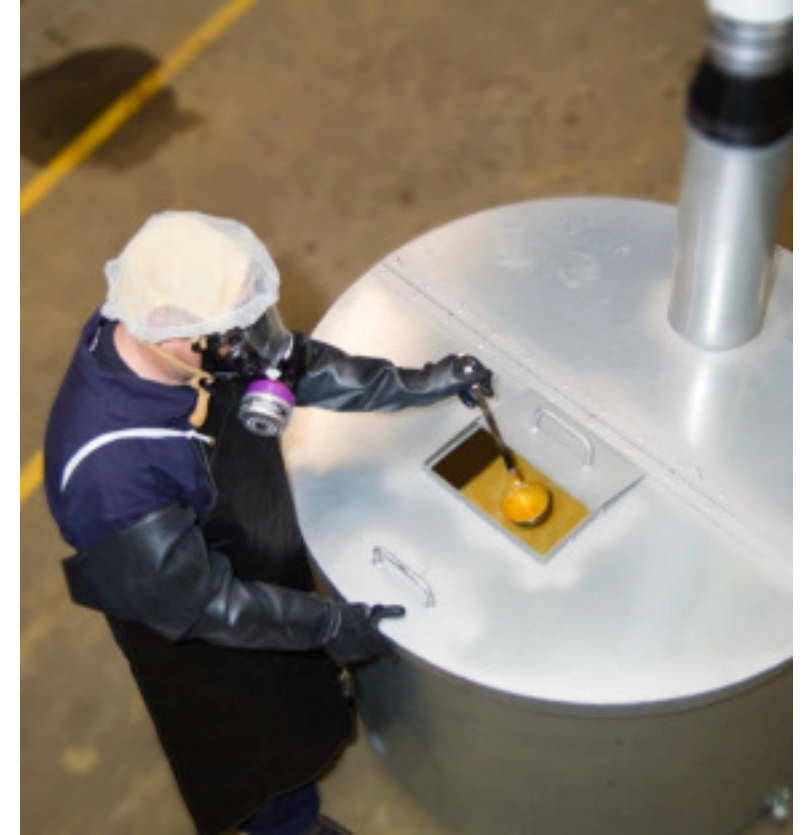
- One of the best ways to prevent and control occupational injuries, illnesses, and fatalities is to "design out" or minimize hazards and risks.
- NIOSH leads a national initiative called Prevention through Design (PtD).
- PtD encompasses all of the efforts to anticipate and design out hazards to workers in facilities, work methods and operations, processes, equipment, tools, products, new technologies, and the organization of work.
- The Occupational Exposure Banding Initiative emerged from this fundamental philosophy



HIERARCHY OF OELS



WHY DO WE NEED OEBs?



CHEMICALS IN COMMERCE

OCCUPATIONAL EXPOSURE LIMITS



- Approximately 85,000 chemicals in commerce.

- Approximately 1,000 chemicals with authoritative OELs

WHAT IS OCCUPATIONAL EXPOSURE BANDING?

A mechanism to quickly and accurately assign chemicals into “categories” or “bands” based on their health outcomes and potency considerations

	A	B	C	D	E
Particulate/Dust	>10 mg/m ³	>1 to 10 mg/m ³	>0.1 to 1 mg/m ³	>0.01 to 0.1 mg/m ³	≤0.01 mg/m ³
Gas/Vapor	>100 ppm	>10 to 100 ppm	>1 to 10 ppm	>0.1 to 1 ppm	≤0.1 ppm

NIOSH OCCUPATIONAL EXPOSURE BANDS

Occupational Exposure Band	Airborne Target Range for Particulate Concentration (mg/m ³)	Airborne Target Range for Gas or Vapor Concentration (ppm)
A	>10mg/m ³	>100 ppm
B	>1 to 10 mg/m ³	>10 to 100 ppm
C	>0.1 to 1 mg/m ³	>1 to 10 ppm
D	>0.01 to 0.1 mg/m ³	>0.1 to 1 ppm
E	≤0.01 mg/m ³	≤0.1 ppm

THE PROMISE OF OCCUPATIONAL EXPOSURE BANDING

- Facilitates more rapid evaluation of health risk
- Provides guidance for materials without OELs
- Highlights areas where data are missing
- Provides a screening tool for the development of RELs
- Identifies hazards to be evaluated for elimination or substitution
- Aligned with GHS for hazard communication
- Facilitates the application of Prevention through Design principles

IS THIS THE SAME AS CONTROL BANDING? NO.

- ***COSHH Essentials*** is a control banding tool that helps small and medium-sized enterprises to do risk assessments for chemicals and mixtures of chemicals
 - identifies the control band (control approach),
 - produces advice on controlling risk from the chemical used in the specified task, and
 - provides written guidance and documentation as a result of the assessment
- NIOSH has reviewed control banding strategies previously



OCCUPATIONAL EXPOSURE BANDING IS DIFFERENT!

- OEBs derived from **toxicology** and **potency**
- OEBs can be used to identify one of many control strategies

Assessment of
hazard potential
using Occupational
Exposure Banding

Assignment of a
health based OEB

Risk Management
Strategies

TOOLS FOR THE OCCUPATIONAL HYGIENIST

**GHS
classifications**

**Engineering
Controls**

**Hazard
Communication**

PPE

Exposure Monitoring

**Occupational
Exposure
Bands**

Medical Surveillance

OELS

**Quantitative Risk
Assessments**



HOW IS THE PROCESS ORGANIZED?

Bands are assigned based on the findings for nine standard toxicological endpoints:

1. Carcinogenicity
2. Reproductive toxicity
3. Specific target organ toxicity resulting from repeated exposure
4. Acute toxicity
5. Genotoxicity
6. Skin corrosion and irritation
7. Respiratory sensitization
8. Skin sensitization
9. Serious eye damage and irritation

Tier 1 —GHS Hazard Codes

User: Health and safety generalist

A Tier 1 evaluation utilizes GHS Hazard Statements and Categories to identify chemicals that have the potential to cause irreversible health effects.



Tier 2— Secondary Data Sources

User: Properly trained occupational hygienist

A Tier 2 evaluation produces a more refined OEB, based on point of departure data from reliable sources. Data availability and quality are considered.



Tier 3—Expert Judgement

User: Toxicologist or experienced occupational hygienist

Tier 3 involves the integration of all available data and determining the degree of conviction of the outcome.

TIER 1 OVERVIEW



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TIER 1

- GHS hazard codes and categories provide the basis for Tier 1 criteria
- Relatively low data requirements
- Chemicals can be banded in bands C, D, and E
- Chemicals are assigned Tier 1 OEBs based on severity and reversibility of effects
- Tier 1 is useful as a screening tool, but Tier 2 is recommended if data and expertise are available

GLOBALY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING OF CHEMICALS

- GHS is a hazard classification system developed by the United Nations to standardize chemical regulations in different countries
 - Within GHS, each physical or health hazard is a **hazard class** (e.g., Carcinogenicity is a hazard class)
 - A hazard class may be sub-divided into several **hazard categories** based on the severity of the hazard
 - GHS uses alphanumeric **hazard codes** to represent these hazards

GHS CODES NOT USED IN BANDING

- H200 codes (physical hazards)
- H400 codes (ecological hazards)
- H303, H304, H305, H313, H316, H320, H333, H335, H336, H362
 - Not occupationally relevant, OR
 - Not sufficient to affect the result of Tier 1 banding

TIER I Process

Chemical of interest has no OEL

Locate GHS hazard codes and categories in recommended databases

Compare hazard codes and categories with NIOSH criteria for each health endpoint

Assign band for each relevant health endpoint based on criteria

Assign a Tier I OEB for the chemical based on most protective endpoint band (C, D, or E)

TIER I Criteria		C	D	E		
OEL Ranges	Particle	> 0.1 to ≤ 1 milligrams per cubic meter of air (mg/m ³)	> 0.01 to ≤ 0.1 mg/m ³	≤ 0.01 mg/m ³		
	Vapor	> 1 to ≤ 10 parts per million (ppm)	> 0.1 to ≤ 1 ppm	≤ 0.1 ppm		
Acute Toxicity		H301 Category 3	H300 Category 2	H300 Category 1		
		H302 Category 4				
		H331 Category 3	H330 Category 2	H330 Category 1		
		H332 Category 4				
		H311 Category 3	H310 Category 2	H310 Category 1		
		H312 Category 4				
		Skin Corrosion/ Irritation		H315 Category 2		H314 Category 1, IA, IB, or IC
		Serious Eye Damage/ Eye irritation		H319 Category 2, 2A or 2B		H318 Category 1
		Respiratory and Skin Sensitization		H317 Category 1B	H317 Category 1 or IA	
					H334 Category 1B	H334 Category 1 or IA
		Genotoxicity			H341 Category 2	H340 Category 1, IA or IB
		Carcinogenicity				H350 Category 1, IA, or IB
				H351 Category 2		
Toxic to Reproduction		H361 (including H361f, H361d, and H361fd) Category 2	H360 (including H360f, H360d, and H360fd) Category 1B	H360 (including H360f, H360d, and H360fd) Category 1 or IA		
Specific Target Organ Toxicity		H371 Category 2		H370 Category 1		
		H373 Category 2		H372 Category 1		

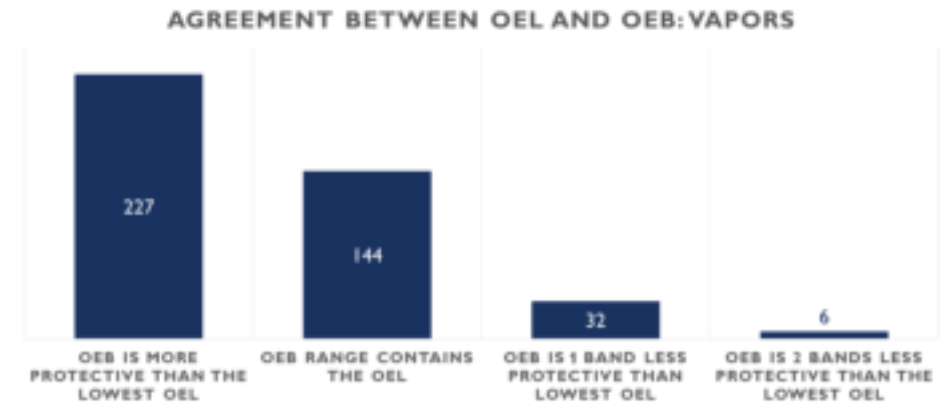
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OEL Ranges	Particle	> 0.1 to ≤ 1 milligrams per cubic meter of air (mg/m ³)	> 0.01 to ≤ 0.1 mg/m ³	≤ 0.01 mg/m ³
	Vapor	> 1 to ≤ 10 parts per million (ppm)	> 0.1 to ≤ 1 ppm	≤ 0.1 ppm
Acute Toxicity	H301 Category 3	H300 Category 2	H300 Category 1	
	H302 Category 4			
	H331 Category 3	H330 Category 2	H330 Category 1	
	H332 Category 4			
	H311 Category 3	H310 Category 2	H310 Category 1	
	H312 Category 4			
	H315 Category 2		H314 Category 1, IA, IB, or IC	
	H319 Category 2, 2A or 2B		H318 Category 1	
Respiratory and Skin Sensitization	H317 Category 1B	H317 Category 1 or IA		
		H334 Category 1B	H334 Category 1 or IA	
Genotoxicity		H341 Category 2	H340 Category 1, IA or IB	
Carcinogenicity			H350 Category 1, IA, or IB	
			H351 Category 2	
Toxic to Reproduction	H361 (including H361f, H361d, and H361fd) Category 2	H360 (including H360f, H360d, and H360fd) Category 1B	H360 (including H360f, H360d, and H360fd) Category 1 or IA	
Specific Target Organ Toxicity	H371 Category 2		H370 Category 1	
	H373 Category 2		H372 Category 1	

TIER I Criteria		C	D	E
OEL Ranges	Particle	> 0.1 to ≤ 1 milligrams per cubic meter of air (mg/m ³)	> 0.01 to ≤ 0.1 mg/m ³	≤ 0.01 mg/m ³
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	H302 Category 4			
	H331 Category 3	H330 Category 2	H330 Category 1	
	H332 Category 4			
	H311 Category 3	H310 Category 2	H310 Category 1	
	H312 Category 4			
	H315 Category 2	H314 Category 1, IA, IB, or IC		
	H319 Category 2, 2A or 2B		H318 Category 1	
H317 Category 1B	H317 Category 1 or IA			
		H334 Category 1B	H334 Category 1 or IA	
	H341 Category 2	H340 Category 1, IA or IB		
		H350 Category 1, IA, or IB		
		H351 Category 2		
	H361 (including H361f, H361d, and H361fd) Category 2	H360 (including H360f, H360d, and H360fd) Category 1B	H360 (including H360f, H360d, and H360fd) Category 1 or IA	
	H371 Category 2		H370 Category 1	
	H373 Category 2		H372 Category 1	

TIER I EVALUATION

Compared bands obtained from Tier I process for 744 chemicals with full shift OELs from the following authoritative bodies:

- NIOSH Recommended Exposure Limits (RELs)
- OSHA – Permissible Exposure Limits (PELs)
- ACGIH– Threshold Limit Values (TLVs)
- AIHA – Workplace Environmental Exposure Levels (WEELs)
- California OSHA Program (Cal/OSHA) – PELs
- German Maximale Arbeitsplatz-Konzentration (MAK)



** Greater than 80% of Tier I bands at least as protective as the OEL

TIER 2 OVERVIEW



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TIER 2

Tier 2 is always recommended, but especially useful when:

- there are no GHS H codes
- the outcome of the Tier I analysis is incomplete, or an insufficient reflection of the health potency of the chemical

TIER 2

Tier 2 — Both Qualitative and Quantitative

- Some training in toxicology
- Based on readily available secondary data from authoritative sources (government, professional health agencies, authoritative toxicological benchmarks)
- Needs sufficient data to generate reliable OEB
- Prescriptive analytical strategy to ensure consistency
- Potential for chemicals to be moved from the Tier I OEB to a more or less protective OEB

TIER 2 Process

Begin Tier 2 process

Search recommended databases for toxicity information

Compare data to NIOSH criteria for each health endpoint and assign endpoint band and endpoint determinant score

Ensure that total determinant score is sufficient for banding

Assign a Tier 2 OEB for the chemical based on most protective endpoint band

TIER 2 BANDING PROCESS

- ***Search authoritative databases for summary toxicity information:***

For 9 specified health endpoints, search authoritative databases for summary toxicity information

- ***Combine information through a weighted score:***

Find the weighted score (Total Determinant Score) and calculate the Occupational Exposure Band (this is done automatically in the e-Tool)



TOTAL DETERMINANT SCORE

- **Endpoint determinant score (EDS)** = weighted score indicating the presence/absence of data for a specific health endpoint.
- **Total determinant score (TDS)** = sum of weighted scores for each health endpoint. Overall score gives an indication of sufficiency of data for banding.
TDS \geq 30: sufficient data for banding in Tier 2

Example: a cancer inhalation unit risk value tells us a lot about the hazardous nature of a chemical, so the presence of that information corresponds to a EDS of 30. However, an LD50 value for the acute toxicity endpoint is only weighted as a EDS of 5.

TOTAL DETERMINANT SCORE

Health Endpoint	Endpoint Determinant Score (EDS)
Skin Irritation/Corrosion	5
Eye Irritation/Corrosion	5
Skin Sensitization	5
Acute Toxicity/Lethality (LD ₅₀ or LC ₅₀)	5
Genotoxicity	5
Respiratory Sensitization	10
Systemic Target Organ Toxicity (STOT-RE)	30
Reproductive and Developmental Toxicity	30
Cancer Weight of Evidence Descriptor	20 or 30
Cancer Quantitative Measures	30
Data Sufficiency/Total Determinant Score (TDS)	30/125

TIER 2 EVALUATION PROCESS

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Purpose	To prototype training and conduct preliminary interrater reliability.	To conduct large scale banding effort and refine process.	To review endpoints results with interrater reliability.	To obtain additional data on Tier 2 endpoints to determine level of detail within endpoint descriptions.	To assess accuracy and usability across chemicals for additional chemicals.
Lessons learned	Some data source websites linked to another that had lesser quality.	Some endpoints such as skin sensitization needed more information.	Recruitment was easy, it was difficult to obtain completed information from reviewers. Learning curve was significant.	Confusion on TDS scoring in some cases.	Good agreement with endpoints based upon quantitative data.
Resulting OEB Methodology Improvements	Data sources curtailed to insure data quality	Materials with key sources were created. Skin sensitization endpoint documentation re-written.	Genotoxicity endpoint description was rewritten. Training on Tier 2 re-designed with example	TDS was streamlined and enhanced for clarity.	Endpoints based upon qualitative endpoints such as genotoxicity were further refined to aid in users finding information sources

TIER 2 EVALUATION

- Evaluations for interrater reliability and accuracy:
 - Compared user banding results across chemicals
 - Results: Overall good agreement among users. Some endpoints (especially those requiring scientific judgement) have variable results
 - Compared OEBs with existing OELs
 - Results: OEBs, in general, at least as protective as OELs

TIER 3 Process

- Requires expertise in toxicology
- Requires intensive review and evaluation of primary data
- Is required when insufficient data for Tier 2 banding
- Completed when no detailed guidance is available

MORE THAN A BAND

- Identify potential health effects and target organs
- Identify health risks to improve health communication
- Inform implementation of control interventions
- Inform medical surveillance decisions
- Provide critical information in a timely fashion



MORE THAN A BAND (CONT'D.)

- Innovative approach to provide guidance prescriptive enough to be used by small- and medium-sized establishments
- Occupational Exposure Banding process to provide guidance for chemicals without OELs
- Accompanying electronic tool (e-Tool) also created



ADDITIONAL GUIDANCE

CDC Centers for Disease Control and Prevention
 The National Institute for Occupational Safety and Health (NIOSH)

Occupational Exposure Banding


Overview

Occupational exposure banding, also known as hazard banding, is a process intended to quickly and accurately assign chemicals into specific categories (bands), which correspond to a range of exposure concern levels designed to protect worker health. These bands are assigned based on a chemical's toxicological potency and the adverse health effects associated with exposure to the chemical (1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)(15)(16)(17)(18)(19)(20)(21)(22)(23)(24)(25)(26)(27)(28)(29)(30)(31)(32)(33)(34)(35)(36)(37)(38)(39)(40)(41)(42)(43)(44)(45)(46)(47)(48)(49)(50)(51)(52)(53)(54)(55)(56)(57)(58)(59)(60)(61)(62)(63)(64)(65)(66)(67)(68)(69)(70)(71)(72)(73)(74)(75)(76)(77)(78)(79)(80)(81)(82)(83)(84)(85)(86)(87)(88)(89)(90)(91)(92)(93)(94)(95)(96)(97)(98)(99)(100)



Wikipedia Occupational exposure banding

Occupational exposure banding, also known as hazard banding, is a process intended to quickly and accurately assign chemicals into specific categories (bands), which correspond to a range of exposure concern levels designed to protect worker health. These bands are assigned based on a chemical's toxicological potency and the adverse health effects associated with exposure to the chemical. The output of this process is an occupational exposure band (OEB). Occupational exposure banding has been used for the pharmaceutical sector and by some major chemical companies over the past several decades to establish exposure control levels or ranges for new or existing chemicals that do not have formal OELs. Furthermore, occupational exposure banding has become an important component of the hierarchy of Occupational Exposure Controls (OECs).



YouTube Occupational Exposure Banding

A conversation with Lauralynn Taylor McKernan, ScD CIH
 Captain, US Public Health Service
 NIOSH/CDC

Occupational Exposure Banding – A conversation with Lauralynn Taylor McKernan, ScD, CIH

6070 views

Published on Mar 26, 2017

Lauralynn Taylor McKernan (CIH), explains the new proposed NIOSH occupational exposure banding methodology and the impact it could have on the occupational safety and health field. Occupational exposure banding is a process of quickly and accurately assigning chemicals into specific categories (bands). These bands are assigned based on a chemical's potency and the adverse health effects associated with

FEDERAL REGISTER

Draft Current Intelligence Bulletin: The Occupational Exposure Banding Process: Guidance for the Evaluation of Chemical Hazards; Notice of Public Meeting; Request for Comments

A Notice by the Centers for Disease Control and Prevention on 03/20/17

This document was corrected by an document published on 03/20/17

AGENCY: National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (HHS).

ACTION: Notice of public meeting and availability of draft document for public comment.

SUMMARY: The National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC) announces the availability of a draft Current Intelligence Bulletin entitled The Occupational Exposure Banding Process: Guidance for the Evaluation of Chemical Hazards for public comment. NIOSH is seeking comments on the draft document and plans to have a public meeting to discuss the document. The draft document was published at www.regulations.gov by entering CDC into the search field and adding "bands."

NIOSH Occupational Exposure Banding e-Tool (DRAFT)

Occupational Exposure Banding e-Tool

Overview

Chemical Information

Chemical Name:

CAS Number:

Physical State

Liquid/Vapor
 Particle
 Liquid/Vapor & Particle

Submit Tier One

Select	Hazard Category	Hazard Code
<input type="radio"/>	1	0A
<input type="radio"/>	1a	0A
<input type="radio"/>	1b	0A
<input type="radio"/>	1c	0A
<input type="radio"/>	2	0B

OCCUPATIONAL EXPOSURE BANDING E-TOOL



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CDC - NIOSH



NIOSH Occupational Exposure Banding e-Tool

Overview

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that is expected to protect worker health. For more information on occupational exposure banding please refer to the NIOSH occupational exposure banding topic page: [occupational exposure banding](#).

The **occupational exposure banding e-Tool** is a supplementary online application that incorporates the occupational exposure banding process and allows users to apply toxicology and potency information to generate quantitative exposure guidance for chemicals. The Occupational Exposure Banding e-Tool should be used in concert with the Current Intelligence Bulletin (CIB). The CIB contains detailed instructions for searching for and choosing appropriate data for banding. This e-Tool is a supplementary tool meant to assist with Tier 1 and Tier 2 banding. To learn more click here: [e-Tool](#).

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Spotlight
[Draft Current Intelligence Bulletin: The NIOSH Occupational Exposure Banding Process: Guidance for the Evaluation of Chemical Hazards](#)

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NIOSH Occupational Exposure Banding e-Tool (version 1.0)

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Confirm password

- Must be 6 or more characters.
- Must contain one uppercase character (A through Z)
- Must contain one lowercase character (a through z)
- Must contain one number (0 through 9)
- Must contain one symbol (such as \$, !, #, %)

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About

The rate at which new chemicals are being introduced into commerce significantly outpaces occupational exposure limit (OEL) development, creating a need for risk guidance on thousands of chemicals that lack evidence-based exposure limits. Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that is expected to protect worker health (Figure 1). Not to be confused with control banding (which gives guidance on control measures), the proposed NIOSH occupational exposure banding process uses available, but often limited, toxicological data to determine a potential range of exposure levels to chemicals to guide risk management decisions. For more information on occupational exposure banding please refer to the NIOSH occupational exposure banding topic page: [Occupational Exposure Banding](#).



Figure 1: Occupational Exposure Bands (OEBs) define the range of exposures expected to be protective of worker health. The bands range from band A to band E. Band E represents the lowest range of exposure concentrations, while band A represents the highest range [McKernan et al. 2016].

To assist users of the occupational exposure banding process, an e-Tool has been developed. The NIOSH Occupational Exposure Banding e-Tool will allow users to apply toxicology and potency information to generate quantitative exposure guidance for chemicals. Users of the e-Tool are provided a series of screens which allow them to input toxicological information on nine different health endpoints related to exposure to the chemical that they are evaluating. The e-Tool provides links to publicly available databases and resources to aid the user in search of data. Once entered, the e-Tool compares the data to predefined NIOSH criteria and supplies an OEB that corresponds to a range of exposure concentrations. Ultimately, the e-Tool facilitates the use of the draft occupational exposure banding process and eliminates the need to go through the process manually.

Spotlight
[Draft Current Intelligence Bulletin: The NIOSH Occupational Exposure Banding Process: Guidance for the Evaluation of Chemical Hazards](#) 

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Overview

Tier 1 produces a qualitative occupational exposure band (OEB) assignment based on Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Tier 1 involves assigning the OEB based on criteria aligned with specific GHS hazard codes and categories. Chemicals with potential to cause serious or irreversible health effects at relatively low doses warrant assigning band D or band E. Chemicals that are likely to cause reversible health effects at higher concentrations are categorized in band C. Bands A and B are not assigned in Tier 1. Tier 1 is intended to be used by individuals with basic toxicology knowledge.

Please note that the following hazard codes will not be used for Tier 1 Banding: H200's (physical hazards), H303, H305, H313, H316, H320, H333, H335, H336, H362, and H400's (environmental hazards). If a chemical has been assigned any of these codes, they will not contribute to the Tier 1 band assignment.

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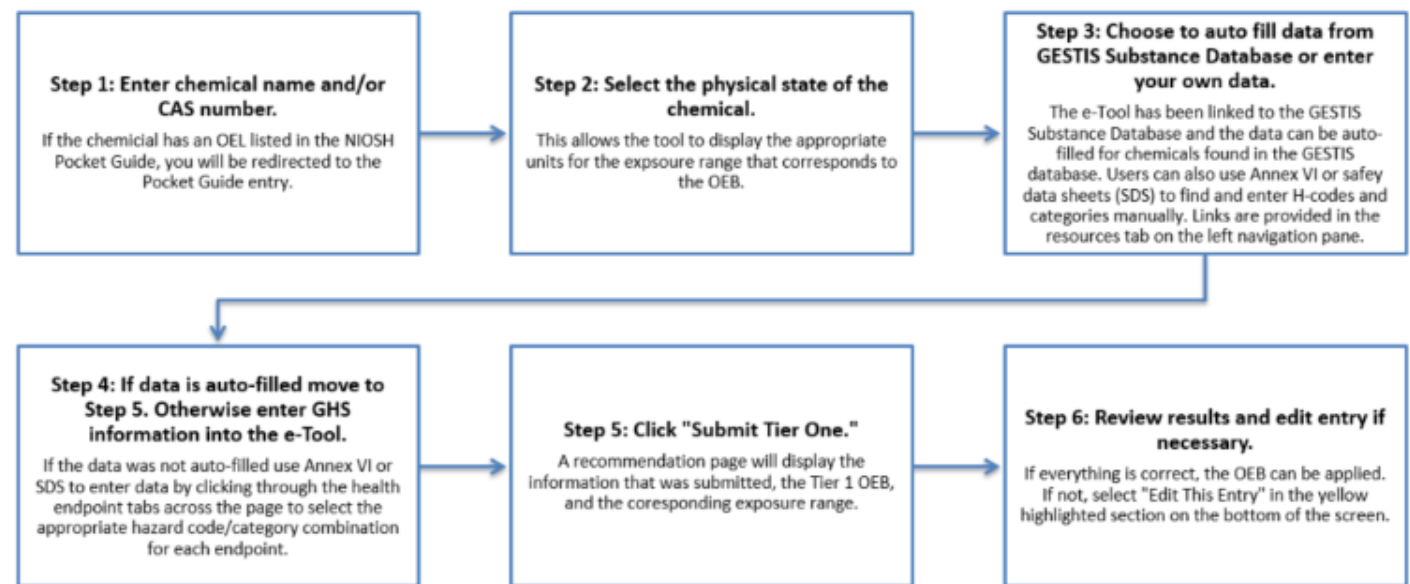
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Basic instructions to use the Occupational Exposure Banding e-Tool for Tier 1.



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Chemical Information

Chemical Name

CAS Number

Physical State

- Vapor
- Particles
- Vapor & Particles

Auto Fill Gestis Data?

- Yes
- No



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Chemical Information

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Please note that the following hazard codes will not be used for Tier 1 Banding: H200's (physical hazards), H303, H305, H313, H316, H320, H333, H335, H336, H362, and H400's (environmental hazards). If a chemical has been assigned any of these codes, they will not contribute to the Tier 1 band assignment.

Chemical Information

Chemical Name x

CAS Number

Physical State

Vapor formaldehyde cyanohydrin

Particulate formaldehyde diethyl acetal

Vapor formaldehyde di-n-butyl acetal

Auto Fill Gestis De

Yes formaldehyde reaction product with butylphenol

No formaldehydedimethylacetal

Submit Chemical

formalin

formalith

formamide

formamidinesulfinic acid

formamine

formanilide

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Chemical Information

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Chemical Information

Chemical Name

[NIOSH Pocket Guide](#) lists an OEL for this chemical. Tier 1 Banding is not recommended

CAS Number

[NIOSH Pocket Guide](#) lists an OEL for this chemical. Tier 1 Banding is not recommended

Physical State

- Vapor
- Particles
- Vapor & Particles

Auto Fill Gestis Data?

- Yes
- No

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Tier One

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[Gestis](#) lists the information of this chemical. It has been auto-filled.

Chemical Information

Chemical Name

CAS Number

Physical State

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- [Resp/Skin Sensitization](#)
- [Acute Tox](#)
- [Skin Corr/Irr](#)
- [Eye Damage/Irr](#)

Carcinogenicity

Select	Hazard Category	Hazard Code	Hazard Statement
<input type="radio"/>	1	350	May cause cancer
<input type="radio"/>	1a	350	May cause cancer
<input type="radio"/>	1b	350	May cause cancer
<input type="radio"/>	2	351	Suspected of causing cancer

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Tier One Recommendation

Overall Recommended Band

D

Vapor Range: > 0.1 and < 1 ppm
Particle Range: > 0.01 and < 0.1 mg/m³

Chemical Name: Ethylene glycol methacrylate
CAS#: 868-77-9

Endpoint	Hazard Code	Hazard Category	Endpoint Band
Acute Toxicity	Dermal		
	Oral		
	Inhalation		
Skin Corrosion/Irritation	315	2	C
Serious Eye Damage/ Eye Irritation	319	2	C
Respiratory and Skin Sensitization	317	1 (skin)	D
Germ Cell Mutagenicity			
Carcinogenicity			
Reproductive Toxicity			
Specific Target Organ Toxicity			
Overall Recommended Band			D

Please do not use the back button. Using the back button will result in multiple entries. Click the button below to make changes to data inputs.

[Edit this Entry](#)

- Grey Box – No Data Entered

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List of Existing Tier One Entries

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Chemical Name +	CAS Number	Vapor Range	Particles Range	Recommended Band			
test rane 11	test rane 11	<= 0.1 ppm	<= 0.01 mg/m ³	E	Edit	Delete	Print PDF
test rane 1	test rane 1	<= 0.1 ppm		E	Edit	Delete	Print PDF
test rane	all hands	<= 0.1 ppm		E	Edit	Delete	Print PDF
test 45	test 45	<= 0.1 ppm	<= 0.01 mg/m ³	E	Edit	Delete	Print PDF
test 24		> 1 and < 10 ppm	> 0.1 and < 1 mg/m ³	C	Edit	Delete	Print PDF
test 111	106-94-5	> 1 and < 10 ppm	> 0.1 and < 1 mg/m ³	C	Edit	Delete	Print PDF
test 1 rane	test 1 rane	<= 0.1 ppm		E	Edit	Delete	Print PDF

Tier One Entry List

Chemical Name	CAS Number	Liquid Range	Particles Range	Recommended Band
Rane Test 1	1	> 1 and < 10 ppm		C
Rane Test 2	2		> 0.01 and < 0.1 mg/m ³	D
Rane Test 3	3	<= 0.1 ppm	<= 0.01 mg/m ³	E
Rane Test 4	4		> 0.1 and < 1 mg/m ³	C
Rane Test 5	5	<= 0.1 ppm		E
Rane Test 6	6		<= 0.01 mg/m ³	E
Rane Test 7	7	<= 0.1 ppm	<= 0.01 mg/m ³	E
Rane Test 8	8	> 1 and < 10 ppm	> 0.1 and < 1 mg/m ³	C

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Tier Two

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Chemical Information

Chemical Name

CAS Number

Physical State

- Vapor
- Particles
- Vapor & Particles

- [Carcinogenicity](#)
- [Reproductive Tox](#)
- [STQT](#)
- [Genotoxicity](#)
- [Sensitization \(resp\)](#)
- [Sensitization \(skin\)](#)
- [Acute Tox](#)
- [Skin Irr](#)
- [Eye Irr](#)

Carcinogenicity

Weight of Evidence (WOE)

Source:

Category: +

Quantitative Assessment

Source:

Data from above Source: x +

Please ensure the units are correct

Notes:

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- Launch of e-Tool
- AIHce PDC



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