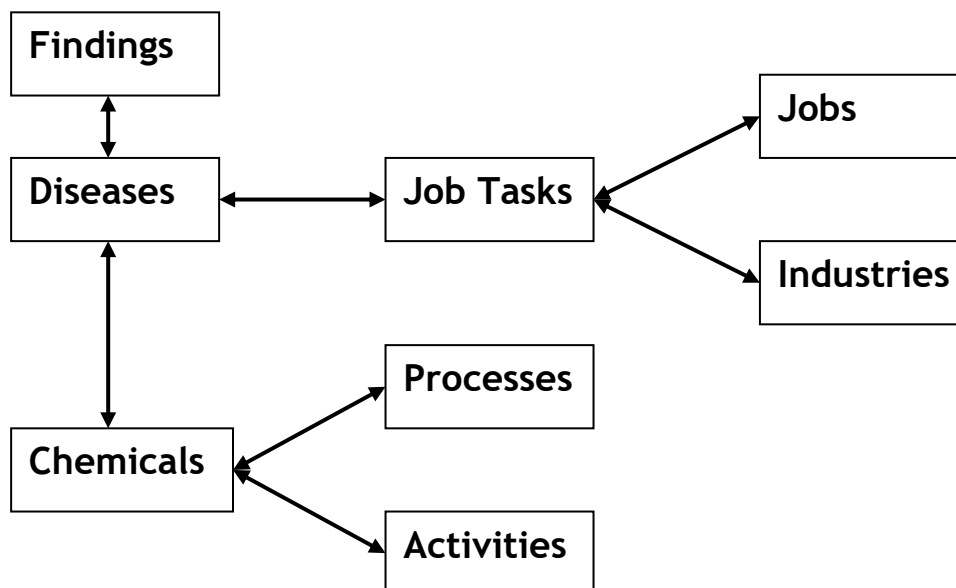
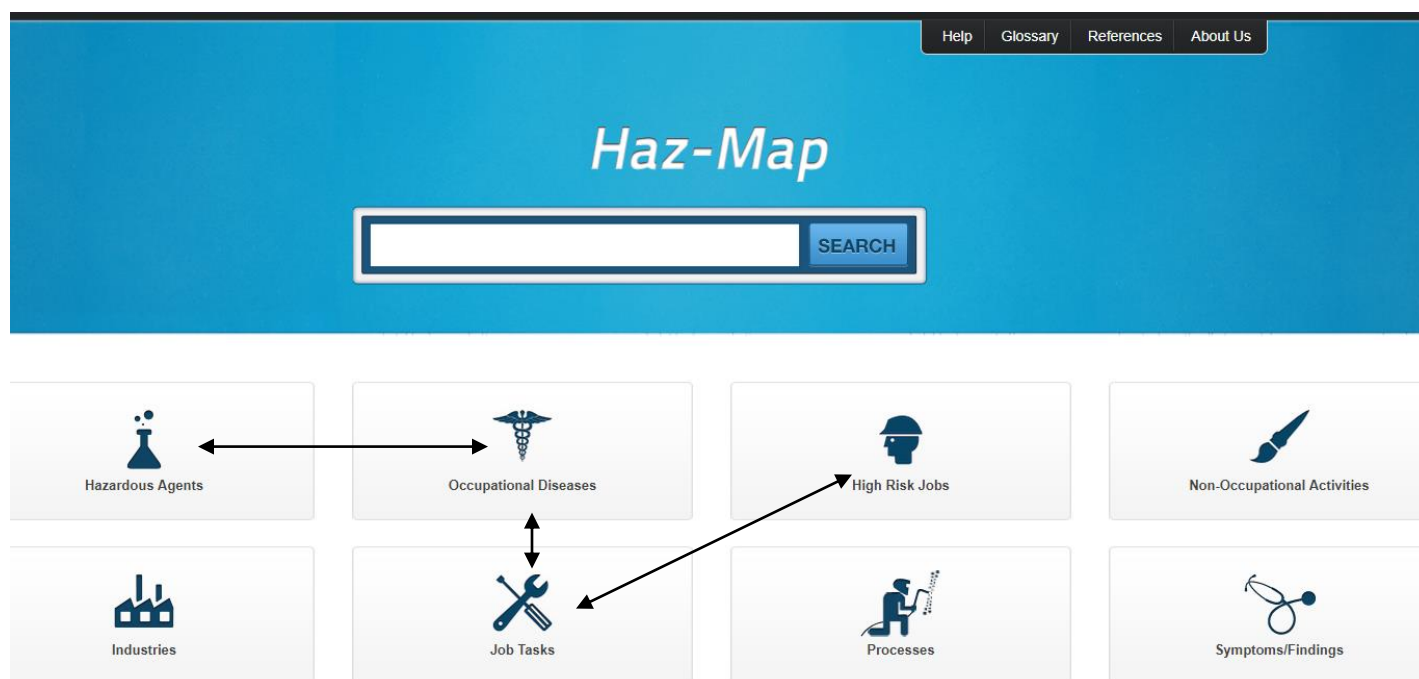


Two levels of information in Haz-Map: chemicals (toxicity) and diseases (toxicity and exposure).



The "Chemicals" table is also referred to as the "Agents" table.



Haz-Map®: Information on Hazardous Chemicals and Occupational Diseases
by
Jay A. Brown, M.D., M.P.H.

This is a screenshot of the user interface at <https://hazmap.nlm.nih.gov>. The three bidirectional arrows show the most important relationships between tables. One can see which chemicals can cause each occupational disease or which diseases are caused by each chemical.

Major Agent Categories

Metals
Solvents
Pesticides
Mineral Dusts
Toxic Gases & Vapors
Plastics & Rubber
Biological Agents
Nitrogen Compounds
Other Classes
Other Uses
Dyes
Physical Agents

Job Task Categories

Applying Glues or Sealants
Applying Pesticides
Applying Surface Coatings
Beauty Culture
Cleaning or Disinfecting
Construction
Contact with Humans or Animals
Dyeing or Tanning
Electroplating
Food Processing
Handling Animals
Handling Chemicals
Handling Insects
Handling Plants
Heating or Machining Metal
Heating or Machining Plastics/Rubber
Installing or Removing Insulation
Manufacturing
Medical or Dental Services
Mining or Quarrying
Miscellaneous
Printing or Photography
Processing Materials
Processing Moldy Organic Materials
Removing Coatings
Smelting or Casting Metal
Spill or Confined Space Accident
Woodworking
Working Indoors
Working Outdoors

Disease Categories

Acute Poison
Airway Disease
Cancer, Occupational
Chronic Poison
Hypersensitivity Pneumonitis
Infection, Occupational
Infection, Travel
Metal Poisoning
Pneumoconiosis
Reproduction
Skin Disease

Job Categories

Arts & Media
Assemblers & Fabricators
Cleaning & Pest Control
Construction
Crop & Livestock Production
Engineering, Sciences & Education
Extractive
Farmworkers
Fishing & Hunting
Food Processing
Food Service
Grounds Maintenance
Health
Installation, Maintenance & Repair
Logging, Forest & Conservation
Material Moving
Metalworking & Plasticworking
Miscellaneous Production
Other Services
Printing
Textile, Apparel & Furnishings
Utilities & Transportation
Welding, Soldering & Brazing
Woodworkers

Just like shopping in a supermarket, being familiar with the categories will help you to browse and find a specific item. Agents have Major Categories, and each Major Category has subcategories.

Find classes of chemicals by searching for "classes" at <https://hazmap.nlm.nih.gov>

ACID ANHYDRIDES	ENZYMES	ORGANOPHOSPHATES
ACRYLIC RESINS (MONOMERS)	EPOXY RESINS	PERCHLORATES
ALDEHYDES	FLUORIDES	PHARMACEUTICALS
ALLOYS	FUMIGANTS	PHOSPHIDES
AZIDES	FUNGICIDES	PHTHALATE ESTERS
CARBAMATE INSECTICIDES	GLYCIDYL ETHERS	POLYCYCLIC AROMATIC
CARBIDES	GLYCOL ETHERS	HYDROCARBONS
CHLORATES	HERBICIDES	RARE EARTH METALS
CHLORINATED DIBENZOFURANS	ISOTHIAZOLINONES	STEARATES
CHLORINATED NAPHTHALENES	MINERALS	SULFITES
CHLORINATED SOLVENTS	MONOISOCYANATES	SUNSCREENS
CHLOROFLUOROCARBONS	NITRATES and NITRITES	TERPENES
CHLOROFORMATES	NITRIDES	TEXTILE DYES
CHLOROPHENOLS	NITRILES	THIOLS
CHLOROSILANES	NITROSAMINES	WASTE ANESTHETIC GASES
CYANIDES	ORGANIC SOLVENTS	
DIISOCYANATES	ORGANOMETALS	

In addition to synonyms, uses, and adverse effects, Haz-Map displays industrial hygiene information for each agent including:

- **Vapor pressure, odor thresholds, half-life, and flammability;**
- **TLV, STEL, Ceiling,** and "**Skin**" designation (ACGIH);
- **PEL** (OSHA) and **MAK** (Federal Republic of Germany);
- **IDLH** (Immediately Dangerous to Life or Health from NIOSH)
- **BEI** (Biological Exposure Indices from ACGIH);
- **TIH** designation (Toxic Inhalation Hazard from Emergency Response Guidebook)
- The **LC50** is the 30-minute exposure concentration at which half of the experimental animals are likely to die (Lethal Concentration).
- The **RD50**, an estimate of severe respiratory irritation, is the 10-minute exposure concentration producing a 50% respiratory rate reduction in mice or rats.

Controlled Vocabulary for Adverse Effects: Each Agent in the database has an adverse effect profile defined by yes/no checkboxes or one selection in each list of radio buttons. A neurotoxic agent is designated by the one most prominent effect of five possible options.

Lung Toxin

- ☒ asthma
- ☒ pneumonitis
- ☒ fibrosis
- ☒ chronic bronchitis

Neurotoxin

- ☐ motor neuropathy
- ☐ sensorimotor neuropathy
- ☐ Parkinson's syndrome
- ☐ CNS solvent syndrome
- ☐ other CNS neurotoxin

Hematotoxin

- ☐ methemoglobinemia, primary
- ☐ methemoglobinemia, secondary
- ☐ anemia, aplastic
- ☐ anemia, hemolytic

Dermatotoxin

- ☐ contact dermatitis, photoallergic
- ☐ contact dermatitis, photoirritant
- ☐ chloracne
- ☐ skin burns
- ☒ skin sensitizer

Other Tissue Toxin

- ☐ hepatotoxin, primary
- ☐ hepatotoxin, secondary
- ☐ unspecified
- ☒ nephrotoxin
- ☒ reproductive toxin

Carcinogen

- ☐ known
- ☐ probable
- ☐ possible

Other Poison

- ☐ organophosphate
- ☐ organochlorine
- ☐ uncoupler
- ☐ chemical asphyxiant
- ☐ simple asphyxiant
- ☐ carbamate

54 Industrial Processes in Haz-Map by Category

BURN

Burning Arsenic-Treated Wood
Burning Celluloid
Burning Natural Polymers
Burning Synthetic Polymers

CLEAN

Abrasive Blasting
Acid and Alkali Cleaning of Metals
Cleaning Fossil Fuel Furnaces or Flues
Dry Cleaning
Metal Degreasing
Sterilizing Equipment
Using Disinfectants

FOUNDRY

Metal Preparation and Pouring
Molding and Core Making
Shakeout, Cleaning, and Finishing

HEAT OR MACHINE

Brazing
Forging
Heat Treating
Metal Machining
Soldering

INDUSTRY

Aluminum Producing
Battery Manufacturing
Cement Producing
Farming (Feed Additives)
Farming (Pesticides)
Farming (Respiratory Hazards)
Fur Dressing and Dyeing
Glass Manufacturing
Leather Tanning and Dyeing
Metal Extraction and Refining
Mining
Petroleum Production and Refining
Plastic Composites Manufacturing
Pulp and Paper Processing
Semiconductor Manufacturing
Sewer and Wastewater Treatment
Smelting Copper or Lead
Steel Producing
Textiles (Fiber & Fabric Manufacturing)
Textiles (Printing, Dyeing, or Finishing)

OTHER

Applying Wood Preservatives
Dressing Hair
Firefighting
Insulation Installing and Removing
Photographic Processing
Silk-Screen Printing
Toxic Gas from Spilling Chemical in Water
Working with Glues and Adhesives

PAINT

Painting (Pigments, Binders, and Biocides)
Painting (Solvents)

PLATE

Electroplating
Metal Thermal Spraying

WELD

Gas Welding and Cutting
Welding
Welding Over Coatings

Links between chemicals and processes were made as new chemicals were added to the database. The links were based on the information from the selected references. Were any processes mentioned as being sources or uses of the chemical?

The relationship between Processes and Agents is bi-directional. There are many processes for each agent and many agents for each process.

The most important source for the initial development of this table was *Recognition of Health Hazards in Industry: A Review of Materials and Processes* by William A. Burgess.

Controlled Vocabulary for Findings (Signs and Symptoms)

General

dizziness
fatigue
fever
myalgia
syncope
weight loss

Neurological

concentrating, difficulty
confusion
convulsion
delirium
dementia
dysphagia
fasciculations
gait, abnormal
hallucinations
headache
incoordination
inebriation
irritability
lethargy
memory loss
mood disturbance
neuropathy
opisthotonos
paralysis
paresthesia
rigidity
speech, impaired
stiff neck
stupor and coma
tremor
weakness

Hematologic

anemia
bleeding diathesis
eosinophilia
hemoglobinuria
leukocytosis
leukopenia
lymphadenopathy
splenomegaly
thrombocytopenia

Cardiovascular

arrhythmia
bradycardia
shock
tachycardia

Respiratory

chest pain
chest tightness
clubbing
cough
dyspnea, acute
dyspnea, exertional
hemoptysis
inspiratory rales
pulmonary edema
sputum production
wheezing

Pulmonary Function

obstructive defect
obstructive/restrictive defect
restrictive defect

Chest X-ray

cystic or cavitary lesions
diffuse infiltrates
diffuse infiltrates, interstitial
pattern
hilar lymphadenopathy
hyperinflation
mediastinal widening
pleural effusions
pleural plaques
segmental consolidation
solitary or multiple nodules

Gastrointestinal

abdominal mass
abdominal pain
blood in stool
constipation
diarrhea
hematemesis
hepatomegaly
jaundice
liver function test, abnormal
nausea, vomiting
pus in stool

Genitourinary

hematuria
kidney function test,
abnormal
libido, decreased
oligospermia
proteinuria
pyuria

Skin

acne
burn
cyanosis, acute
dermatitis
keratoses, brown
discoloration
lymphadenitis, acute
lymphangitis
papules or plaques
petechiae and ecchymoses
pustule
rash (exanthem)
skin and subcutaneous
nodule
skin infection
skin vesicles
sweating, excessive
ulcer of skin
urticaria
wart growth of skin

Ears, Nose & Throat

epistaxis
nasal ulcers
pharyngitis
rhinitis
salivation
stomatitis

Eyes

blindness
cataract
conjunctivitis, acute
lacrimation
miosis
vision, impaired

Musculoskeletal

arthralgia
limb pain
low back pain
osteosclerosis