

A listing and summary of evidence regarding occupational factors that may cause human cancer can be found in a series of critical monographs published by the International Agency for Research on Cancer (IARC). Since 1971, the IARC, an agency of the World Health Organization headquartered in Lyon, France, has published more than 60 volumes dealing with cancer risks from individual chemicals, and mixtures of chemicals, in selected occupations or industries. Individual exposures are reconsidered whenever indicated by new information. The most recent summary of all pertinent reviews was published in 1987 (IARC, Supplement 7).

TABLE 1

Chemicals, Groups of Chemicals, or Industrial Processes Carcinogenic to Humans

**GROUP 1:**

**Industrial processes and occupational exposures that are carcinogenic to humans:**

Aluminum production

Auramine manufacture

Boot and shoe manufacture and repair (certain occupations)

Coal gasification

**Coal-tar pitches**

Coke production

**Furniture manufacture**

Iron and steel founding

Isopropyl alcohol manufacture (strong-acid process)

Manufacture of magenta

Nickel refining

Rubber industry (certain occupations)

Underground hematite mining (with exposure to radon)

Chemicals and groups of chemicals that are carcinogenic to humans:

4-Aminobiphenyl

**Arsenic and arsenic compounds**

**Asbestos**

Benzene

Benzidine

N,N-bis(2-chloroethyl)-2-naphthylamine

bis(chloromethyl)ether and chloromethyl ethyl ether

**Chromium and certain chromium compounds**

**Mineral oils**

Mustard gas

2-Naphthylamine

**Nickel and nickel compounds**

Soots, tars, and oils

Vinyl chloride

TABLE 2

Chemicals, Groups of Chemicals, or Industrial Processes Probably or Possibly Carcinogenic to Humans

**GROUP 2A:**

**Probably carcinogenic to humans:**

Acrylonitrile

Benzidine-based dyes

Benzo(a)pyrene

Beryllium and beryllium compounds

**Cadmium and cadmium compounds**

Dimethyl sulphate

Ethylene dibromide

Ethylene oxide

**Formaldehyde**

Ortho-Toluidine

Polychlorinated biphenyls

Propylene oxide

**Silica**

**Styrene oxide**

**Group 2B:**

**Possibly carcinogenic to humans:**

Acetaldehyde

Acrylamide

Amitrole

Auramine (technical grade)

1,3 Butadiene

Carbon black extracts

Carbon tetrachloride

Chlorophenols

Chlorophenoxy herbicides

DDT

3,3'-Dichlorobenzidine

3,3'-Dimethoxybenzidine (Ortho-Dianisidine)

2,4-Diaminotoluene

1,2 Dichloroethane

Dichloromethane

1,4 Dioxane

Epichlorohydrin

Ethyl acrylate

Ethylene thiourea

Hexachlorobenzene  
 Hydrazine  
 Mirex  
 2-Nitropropane  
 Organolead  
 Polybrominated biphenyls  
 Styrene  
 Tetrachlorodibenzo-para-dioxin (TCDD)  
 1,1,2,2 Tetrachloroethane  
 Tetrachloroethylene  
 Toluene diisocyanates  
 Toluidine  
 Toxaphene  
 Urethane

TABLE 3

Cancers Associated with Various Occupations or Occupational Exposures	
CANCER	SUBSTANCES OR PROCESSES
<b>Lung</b>	Arsenic, asbestos, bis(chloromethyl)ether, chromium compounds, coal gasification, mustard gas, nickel refining, foundry substances, radon, soots, tars, oils, acrylonitrile, beryllium, silica
<b>Bladder</b>	Aluminum production, auramine and magenta manufacture, rubber industry, leather industry, 4-aminobiphenyl, benzidine, naphthylamine
<b>Nasal cavity and sinuses</b>	Formaldehyde, isopropyl alcohol manufacture, mustard, gas, nickel refining, leather dust, wood dust
<b>Larynx</b>	Asbestos, isopropyl alcohol, mustard gas
<b>Pharynx</b>	Formaldehyde, mustard gas
<b>Mesothelioma</b>	Asbestos
<b>Lymphatic and hematopoietic system</b>	Benzene, ethylene oxide, chlorophenols, chlorophenoxy, herbicides, X-radiation
<b>Skin</b>	Arsenic, coal tars, mineral oils
<b>Soft-tissue sarcoma</b>	Chlorophenols, chlorophenoxy herbicides
<b>Liver</b>	Arsenic, vinyl chloride

## REFERENCES

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs 1 to 42, (Suppl 7), Lyon, 1987.