



## OCCUPATIONAL HEALTH RISKS **BOILERMAKERS**

**A diagnostic toolkit for physicians  
and primary health providers.  
Prevention information for workers.**

**Give pages 3 and 4 of this booklet to your doctor.  
They give your doctor information about the health risks of your job.**

This booklet was prepared by the Ontario construction industry's Occupational Disease and Research Labour-Management Health and Safety Committee with assistance from the Infrastructure Health & Safety Association (IHSA), the Ontario Ministry of Labour (MOL), the Workplace Safety and Insurance Board (WSIB), and labour and employers in Ontario construction.

The information presented here is for general information only. It should not be regarded or relied upon as a definitive guide to health risks in the trade. This information is, to the best of our knowledge, current at the time of publication. For more information, contact the Infrastructure Health & Safety Association.

## Tasks and possible hazards

### All tasks

- ▶ **Hazardous materials from industrial worksites** (coke ovens, refineries, chemical plants, glass plants, factories, cement plants, pulp and paper mills, power plants)
- ▶ **Awkward postures, vibration, and hazardous noise** when using power tools, grinders, saws, and mobile equipment
- ▶ **Dust** on construction sites.

### Installation, removal, or repair of equipment

- ▶ **Asbestos** (could be part of the old insulation—or in building materials)
- ▶ **Lead**
- ▶ **Solvents, adhesives, and epoxies**
- ▶ **Liquids, sludges, or other materials** on, in, or under equipment
- ▶ **Exhaust fumes** from gas- or diesel-powered equipment
- ▶ **Biological materials** on equipment and in industrial plants.

### Welding, torch cutting, soldering, brazing, grinding

- ▶ **Lead**
- ▶ **Welding fumes, ultraviolet light, heavy metals, and chlorinated compounds**
- ▶ **Dust** from grinding activities.

## How to protect your health

- ▶ Ask your supervisor or employer for safe work **instructions** and training.
- ▶ Consult industrial clients on site-specific health and safety **procedures**.
- ▶ Ask about any hazardous materials or unknown chemicals when **entering** an industrial site for work.
- ▶ Ensure proper **ventilation**.
- ▶ Wear a proper **respirator** when
  - you suspect asbestos may be a hazard
  - working in dusty atmospheres
  - welding
  - using solvents, adhesives, or other hazardous substances.
- ▶ Wear gloves, coveralls or welding jackets, or use barrier creams to protect the **skin**.
- ▶ Consult material safety data sheets (**MSDSs**) for information about hazardous chemicals used at work, and obey workplace health and safety rules.
- ▶ **Never eat, drink, smoke, or chew gum** in areas contaminated with asbestos, lead, or toxic chemicals.
- ▶ Wash or wipe **hands** clean before eating, drinking, and smoking, and always clean up and change out of contaminated **clothing** before going home at the end of the shift.
- ▶ Wash work clothes **separately** from casual and other family members' clothes.
- ▶ **Report** hazards to your employer.

Workers who are without symptoms and who have been exposed to asbestos may participate in a research study at Princess Margaret Hospital by volunteering to be screened for mesothelioma/asbestos.  
Phone: 416-340-5686 Fax: 416-340-4964

**For more information about health and safety in your job, contact your union or**

Infrastructure Health & Safety Association: 1-800-263-5024, [www.ihsa.ca](http://www.ihsa.ca)  
Ontario Ministry of Labour: 1-877-202-0008, [www.labour.gov.on.ca](http://www.labour.gov.on.ca)  
Workplace Safety and Insurance Board: 1-800-387-5540, [www.wsib.on.ca](http://www.wsib.on.ca)

## Occupational diseases and hazardous agents encountered by boilermakers and similar trades

### Asbestos-related Diseases

- ▶ Asbestosis
- ▶ Cancer (lung, mesothelioma, gastrointestinal)—*asbestos*
- ▶ Asbestos warts—*asbestos*.

### Cancer

- ▶ Leukemia—*benzene*
- ▶ Lung—*asbestos, coke oven emissions, diesel, dust, environmental tobacco smoke, silica, bioaerosols, nickel, hexavalent chromium*
- ▶ Gastrointestinal—*asbestos, hexavalent chromium*
- ▶ Haematological/lymphatic—*nickel, vinyl chloride, mineral wool*
- ▶ Nasal—*nickel, hexavalent chromium*
- ▶ Skin—*coal tar, ultraviolet (UV) light*.

### Neurological

- ▶ Chronic solvent toxic syndrome—*solvents, paints, chlorinated solvents, degreasers, thinners*
- ▶ Hand-arm vibration syndrome—*vibrating tools*
- ▶ Lead, subacute toxic effect—*lead*
- ▶ Neuropathy, toxic—*lead*
- ▶ Parkinsonism—*carbon monoxide, manganese*.

### Skin Disorders

- ▶ Dermatitis, contact—*hexavalent chromium, coal tar, epoxies, paints, degreasers, glues*
- ▶ Contact urticaria—*animal dusts*.

### Miscellaneous Disorders

- ▶ Asphyxiation—*work in confined spaces*
- ▶ Gastroenteritis—*bacteria, animal waste*
- ▶ Hantavirus, histoplasmosis, leptospirosis, lymphocytic choriomeningitis—*rodent/bird/bat droppings*
- ▶ Hepatitis (chronic solvent toxicity)—*chlorinated solvents*
- ▶ Infertility, male—*manganese, lead, chlorinated solvents, water-based paint solvents*
- ▶ Noise-induced hearing loss—*noise, power tools, heavy machinery, grinders, industrial noise*
- ▶ Renal disease—*cadmium, degreasers, lead, solvents*
- ▶ Scleroderma/Systemic sclerosis—*silica*.

### Respiratory Diseases

- ▶ Asthma, occupational—*fungi/mould, chromium, dust, mineral fibres, epoxies, PVC*
- ▶ Benign pneumoconiosis—*welding fume*
- ▶ Bronchitis, chronic—*organic dust, construction dust, welding fume, environmental tobacco smoke*
- ▶ Hypersensitivity pneumonitis (HP) acute/chronic—*fungi/mould, wood dust*
  - Chronic bronchitis—*ammonia gas*
  - Isocyanate HP—*polyurethane foams, epoxy*
  - Metal fume fever—*welding fume, iron, galvanized metal fumes*
  - Polymer fume fever—*PVC, plastics, teflon*
  - Pontiac fever, Legionnaires' disease—*Legionella*
  - Pulmonary edema—*cadmium, flux, solder, chlorine decomposition, silica*
- ▶ Silicosis—*silica* (see Scleroderma/Systemic sclerosis).

The next page provides important diagnostic criteria for screening, early detection, and diagnosis.

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## Asbestos disease

Asbestos-caused fibrosis of the lungs and pleura may lead to shortness of breath. It usually takes 15 or more years from the onset of exposure for radiographic abnormalities and symptoms to arise. Radiologists should be alerted to the suspected diagnosis. Boilermakers occupationally exposed to asbestos are at increased risk of cancers of the lungs and pleura. Screening for cancer has not been proven to reduce mortality; however, it can result in early detection.

If there is any suspicion of asbestos-related illness (i.e., not screening scenario), patients may be referred directly to Princess Margaret Hospital's program where immediate assistance, rapid assessment and specialized treatments are available. Phone 1-877-LUNG 911 (5864 911) Fax 416-340-3353. Asbestos-exposed workers should be counseled about smoking cessation.  
[http://www.wsib.on.ca/files/Content/OccDiseaseAsbestos/Asbestos\\_Related%20Diseases.pdf](http://www.wsib.on.ca/files/Content/OccDiseaseAsbestos/Asbestos_Related%20Diseases.pdf)

## Contact dermatitis

Contact dermatitis is an inflammatory skin reaction to direct contact with noxious agents in the environment. Substances that produce this condition after single or multiple exposures may be either irritant or allergic in nature. Irritant contact dermatitis (ICD) results from contact with external agents that directly damage the epidermis, in contrast to allergic contact dermatitis (ACD) in which the damage occurs through the host's immune response as a result of a delayed type hypersensitivity reaction.

The diagnosis of contact dermatitis should be considered when there is a suspected workplace agent (allergen or irritant). Screening should include determination of the following: (A) Did the skin condition start after the worker started the job? OR Did the skin condition become worse after the worker started the job? AND (B) Are symptoms better on weekends or holidays off work? Referral to a specialist with experience diagnosing and treating occupational contact dermatitis should be considered when any of the following are suspected: all cases of possible ACD; ICD with allergic features; chronic ICD; complicated ICD (e.g., not improving, deteriorating, confounded by another skin disease such as psoriasis).  
<http://www.wsib.on.ca/en/community/WSIB/ArticleDetail?vnextoid=ff4de35c819d7210VgnVCM100000449c710aRCRD>

## Inhalation diseases: Silicosis, welding fume fever & polymer fume fever

**Silicosis.** An occupational lung disease caused by inhalation of crystalline silica dust. Silica inflammation and scarring is manifested as nodular lesions in the upper lobes of the lungs. Silicosis is progressive and signs may not appear until years after exposure has begun. Symptoms include: dyspnea on exertion, dry cough, and fatigue. The diagnosis is made by radiographic examination. It is preferred that the films be interpreted by a radiologist with experience with occupational lung disease since the finding may be subtle.  
<http://www.wsib.on.ca/files/Content/OccDiseaseSilicosis/Silicosis.pdf>.

**Welding Fume Fever.** A flu-like illness with a metallic taste in the mouth, throat irritation, and dry cough. Leucocytosis is common. Normal chest x-ray. Occurs 3-10 hours after heavy exposure to zinc oxide fume or dust (e.g., after welding or flame cutting galvanized steel). Resolves spontaneously within 48 hours.

**Polymer Fume Fever.** A flu-like illness with chest tightness and mild cough occurring 4-8 hours after exposure to pyrolysis products of polytetrafluoroethylene (PTFE—trade names: Fluon, Teflon, Halon). There is leucocytosis but normal chest x-ray. Resolves within 48 hours.

## Neurologic effects

Acute toxic effect of solvents: Organic solvents are volatile substances commonly used in the workplace as cleaners and degreasers. The systemic symptoms of acute solvent poisoning resemble those of intoxication from alcoholic beverages.

Toxic Neuropathy: Chemicals that can cause toxic polyneuropathy include lead and N-hexane. Most symmetrical, sensorimotor neuropathies caused by exposure to chemicals are indistinguishable from similar effects caused by systemic diseases such as diabetes or B12 deficiency. The diagnosis of toxic polyneuropathy is usually made on the basis of symptoms following exposure to the chemical and the resolution of symptoms months to years after cessation of exposure.

## Noise-induced hearing loss

Noise-induced hearing loss (NIHL), is diagnosed by audiometric testing. With NIHL, there is a characteristic dip (notch) at 4 kHz on the audiogram. This contrasts with presbycusis where there is a continuous dropoff as frequency increases.  
<http://www.wsib.on.ca/en/community/WSIB/OPMDetail?vnextoid=9956fcea9bfc7210VgnVCM100000449c710aRCRD>

## Occupational asthma

Sensitizer-induced occupational asthma is caused by an immune response to specific workplace agents such as low-molecular-weight chemicals (such as diisocyanates, colophony [a pine resin product used in soldering], or epoxy compounds). Once a person has been sensitized to one of these materials, even exposure to extremely low quantities will exacerbate the asthma. If this form of occupational asthma is suspected from the patient's history, objective investigation is required to confirm or refute the diagnosis.

Patients with confirmed sensitizer-induced occupational asthma should have no further exposure to the causative agent, since the best outcome is achieved with early diagnosis and complete avoidance of exposure. An objectively confirmed diagnosis is very important. Patients with suspected sensitizer-induced occupational asthma should be referred as soon as possible to a specialist (a respirologist, an allergist, or an occupational physician) with expertise in this area. Investigations are most helpful if they can be performed while the patient is still working in the suspected causative work area; the primary care physician may be able to initiate some of these.

Source: Occupational asthma: An approach to diagnosis and management. Tarlo and Liss. *Canadian Medical Association Journal*. Apr 1, 2003. 168(7);867-71.  
[http://www.wsib.on.ca/files/Content/Fact%20Sheet\\_English0619A/0619A\\_Asthma\\_and\\_Work.pdf](http://www.wsib.on.ca/files/Content/Fact%20Sheet_English0619A/0619A_Asthma_and_Work.pdf)

## Scleroderma

Scleroderma is sometimes called systemic sclerosis. It is a type of connective tissue disorder. Diagnosis is recognized if the case is characterized by either:

**Proximal scleroderma** - skin changes suggestive of scleroderma that appear near the finger and wrist joints as well as on other parts of the extremities, face, neck, or trunk of the body. These changes usually appear symmetrically on both sides of the body and almost always include skin changes on fingers and toes.

OR two of the following

- **Sclerodactyl**—skin changes suggestive of scleroderma that is limited to fingers and toes
- **Digital pitting** of fingertips or loss of substance from the finger pad—depressed areas at tips of digits or loss of digital pad tissue
- **Bilateral basilar pulmonary fibrosis**—x-ray evidence of a bilateral pattern of linear or linear-nodular densities in the lower lung that are not due to primary lung disease.

<http://www.wsib.on.ca/en/community/WSIB/OPMDetail?vnextoid=1e27fcea9bfc7210VgnVCM100000449c710aRCRD>