

CHEMICAL HAZARDS

Chemical products and contaminants in the workplace

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This is a translation of the original French version available at: [Programmes de santé au travail pour les établissements / Commission des normes de l'équité de la santé et de la sécurité du travail - CNESST](#). In the event of any discrepancy or inconsistency between the French and English versions, the French version shall prevail.

1. INTRODUCTION

1.1. Background

Workers can be exposed to chemical contaminants¹ in the workplace. In some cases, the effects of exposure can be serious, disabling or even fatal. Occupational diseases and employment injuries can develop in workers following single or chronic exposure (e.g. cancer, asthma, skin sensitization). It is therefore necessary to prevent exposure to chemical contaminants in order to protect workers' health.

While this health program is aimed at preventing health risks associated with chemical contaminants, safety risks such as fire and explosion can also arise from these contaminants. The prevention approach must take both these aspects into account. For information on managing safety risks, you can consult the [toxicological directory](#) (mainly in French but with some English information) developed by the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESTT).

If changes are made to the processes, tasks or products used in the workplace, the approach set out in this occupational health program (OHP) will need to be repeated. The changes will need to be analyzed and the actions chosen adjusted. If no changes are more, periodic reassessment is still recommended.

1.2. Legal obligations

This occupational health program is developed in accordance with section 107 of the *Act respecting occupational health and safety* (AOHS). The employer is required to take it into account in its prevention program (AOHS, s. 59) or in its action plan (AOHS, s. 61.2). This program contains recommendations for the prevention of health problems resulting from exposure to chemical contaminants. In particular, it sets out the preventive measures to be implemented to protect the health of exposed workers. Thus, the employer must determine which actions of the occupational health program to consider and include in its prevention program or action plan, based on the specific workplace.

Section 61 of the AOHS provides that the Commission may order an employer to submit a prevention program. It may also order the employer to amend the content of the program, in particular to bring it into line with the elements of the occupational health programs it develops. Section 127(1) of the AOHS provides that the public health director may evaluate the health program components of a prevention program or action plan and make recommendations to the employer, the Commission and, where applicable, the health and

¹ A **chemical contaminant** is likely to affect workers' health. It can be a solid, liquid or gaseous material, or any combination of these, generated by a piece of equipment, a machine, a process, a product or a substance.

Obligations for employers and workers with respect to chemical hazards are specified, notably in the *Regulation respecting occupational health and safety* (ROHS) in sections V, VI, IX, IX.1,² X and XI as well as in Schedule I. Employers also have obligations under the *Hazardous Products Information Regulation*.

The information presented in this health program provides general guidelines. It is strongly recommended to consult the tools presented in the section [For more information](#) for the preventive actions to be implemented in workplaces.

2. RISK PROFILE

2.1. Overview

In any workplace, workers are likely to be exposed to chemical contaminants at all stages of production or during the tasks performed. Examples include volatile organic compounds (VOCs), acidic or basic products, fumes, mists or food dusts (e.g. flour), spices), wood, metals or minerals. These contaminants can pose a risk during the production, storage, transportation, handling (e.g. transfer) or disposal of chemical products, including consumer products,³ and during processes⁴ or leaks or spills.

2.2. Routes of exposure

Not all contaminants enter the body via the same routes of exposure. Also, the same contaminant can be absorbed by more than one route, and in different proportions. Furthermore, even if the contaminant is not absorbed, it can cause health effects at the point of contact (local effects). The three most common routes of exposure in the workplace are as follows:

- The **respiratory tract**: This is the main route of exposure. The contaminant enters through the nose or mouth. Depending on its physical state (e.g. solid, liquid, gas) and chemical (e.g. solubility) properties, it may reach the lungs. Other factors, such as the concentration of the contaminant, the duration of exposure or the nature of the work may influence the quantity of contaminants absorbed.
- The **cutaneous route (skin and eyes)**: The skin is a barrier between the external environment and the body. However, this barrier is not completely watertight. The chemical properties of many contaminants allow them to damage or pass through the skin or eyes and enter the body. Certain working conditions, such as the task performed, humidity and heat, can also increase the entry of chemical contaminants into the body.

²Section IX.1 specifically covers asbestos. A health program has been developed to address the risks associated with this contaminant. You can refer to it as needed.

³A **consumer product** is any product that can be purchased by an individual and used for domestic, recreational or sports purposes. Such a product is governed under the *Canada Consumer Product Safety Act* and is not subject to WHMIS classification requirements. However, employers have obligations to protect the health, safety and physical integrity of workers under the AOHS.

⁴A **process** is a method or means used to manufacture a product.

- The **digestive tract**: Absorption through this route is less common in the workplace. It often occurs when a contaminant is accidentally swallowed, which is the case when workers eat or smoke without washing their hands. Some substances, such as lead, easily enter the body through the digestive tract and can increase the risk of exposure.

2.3. Health effects

Exposure to chemical contaminants can lead to a variety of health problems, even when regulatory limits are respected, for example, in a context of individual sensitivity. Exposures may be limited to a short period or be repeated, sometimes over many years. Depending on the quantity of contaminants and their toxicity, health effects can manifest in different ways. One or more organs may be affected, depending on the route of entry and the behaviour of the contaminant(s) in the body. In addition, several contaminants can have the same effect on a target organ, thereby increasing the effects in the case of simultaneous exposure. The broad categories of health effects are as follows:

- **Irritation and corrosion:**
 - **Irritation:** These are generally reversible (non-permanent) effects on the skin, eyes and respiratory and digestive tracts. The severity of symptoms varies according to exposure (duration of contact, product concentration, etc.). It should be noted, however, that repeated exposure could lead to chronic health problems such as chronic dermatitis.
 - **Corrosion:** This involves irreversible damage (tissue destruction, burns) to the skin, eyes or respiratory tract.

- **Sensitization (allergy):**

Some contaminants can provoke a reaction in certain people. This reaction may develop on the skin (e.g. allergic contact dermatitis), lungs (e.g. asthma and rhinitis) or eyes (e.g. conjunctivitis).

- **Carcinogenicity (cancer):**

A contaminant is carcinogenic when it increases the risk of developing cancer. Depending on the contaminant and the extent of exposure, cancers can take several years, and often decades, to develop.

- **Mutagenicity (mutation):**

A contaminant is mutagenic when it causes changes in the genetic material of cells. Depending on the type of cells affected, more or less serious effects can occur, such as changes to organ function, effects on potential offspring children or cancer.

- **Reproductive and developmental toxicity:**

Some chemical contaminants can have adverse effects on the functioning of reproductive organs or on fetal development. These effects may be temporary or permanent.

- **Toxicity to specific organs and systems:**

Some chemical contaminants target specific organs or systems, including the central or peripheral nervous system, the renal system (kidneys), hepatic system (liver), cardiovascular system, etc.

In the presence of certain contaminants, pregnant or nursing workers may be entitled to preventive assignment or removal measures under the For a Safe Maternity Experience ([FSME](#)) program.

When chemical contaminants with health effects are sold, they must bear labels identifying the health risk.

Table 1: Pictograms associated with health effects

Pictogram		Health effects
WHMIS	Consumer product	
		Skin corrosion or serious eye damage
		Acute toxicity following ingestion, skin absorption or inhalation
		Respiratory sensitization Mutagenicity Carcinogenicity Reproductive and developmental toxicity Specific target organ toxicity
		Skin sensitization (allergic dermatitis) Skin or eye irritation

The pictograms that may appear on labels are intended to illustrate health and safety effects. Refer to the [Guide to using a safety data sheet](#) (in French only) for more information. Additional information on the routes of exposure and health effects of a chemical contaminant present in a workplace can be obtained by consulting the [CNESST's toxicological directory](#) (mainly in French but with some English information) or the safety data sheet (SDS) available from the manufacturer or supplier. For more information on the effects on workers' health, refer to [Notions of toxicology](#) (in French only) published by the CNESST.

3. PREVENTION APPROACH

3.1. Identify and analyze high-risk situations

This section presents the recommended strategy for **identifying situations presenting a risk of exposure to chemical contaminants**. It is important to follow these steps:

- List any processes, tasks and work situations involving contaminants
- Identify the chemical contaminants
- Document all information relating to hazards associated with the identified contaminants
- Analyze the level of hazard of each contaminant
- Assess the probability of worker exposure
- Assess the risks in order to prioritize them in the prevention program

All this information can be put in a table, making it easier to document and analyze high-risk situations. A sample table is provided in the appendix.

3.1.1. List any processes, tasks and work situations producing contaminants

Various activities can lead to the production of contaminants: mixing, heating, sanding, cutting, drilling, applying, spraying, cleaning, maintenance, etc. Exposure can result directly from a chemical reaction that modifies the raw material and releases contaminants into the air. It can also be caused by direct contact (splashing, dipping hands in contaminant, etc.). It is therefore important to note the tasks, work situations or processes used, and to identify the contaminants produced, in order to assess the level of risk.

3.1.2. Identify the chemical contaminants

To do this, we need to consider **inputs**,⁵ **intermediate products**,⁶ **by-products**⁷ and **outputs**.⁸ Don't forget waste and any products present for other reasons, such as consumer, household or equipment maintenance products (oils and lubricants, for example).

Examples of products used in processes or tasks (inputs) as well as for related tasks:

- raw materials
- reagents
- cleaning products
- abrasives used for sandblasting (e.g. sand, silicon carbide, steel shot, glass beads)

⁵ **Inputs** are materials that are added to processes or tasks and are necessary for their operation.

⁶ **Intermediate products** are the materials obtained following the transformation of inputs by processes or tasks during the various intermediate stages of production.

⁷ **By-products** are the materials resulting from a production process, with the exception of the product targeted for production.

⁸ **Outputs** are the materials obtained at the end of the production process.

If necessary, consult inventory log, purchasing records or supplier invoices, as well as safety data sheets (SDS) and technical data sheets for raw materials, to establish the most complete list possible.

Modified products arising during processes or tasks (intermediates and by-products) as well as those resulting from processes and tasks (outputs):

Identify contaminants such as dust, fumes and vapours that arise during the process. Include those resulting from operations such as grinding, stripping, welding, heating, baking and mixing. Don't forget unwanted residues, waste, slag and fugitive emissions.⁹ Odours will sometimes be a clue to their presence, but they are not always a good indicator, since many contaminants are odourless. Examples of frequently encountered contaminants are provided in the tables in section 3.1.4.

3.1.3. Document all information relating to hazards associated with the identified contaminants

Once the identification of materials, processes, tasks and emissions has been completed, additional research on the risks associated with the chemical contaminants identified must be carried out. To do this, the following information must be recorded:

- Hazards associated with products in the workplace. This information, which can be found in section 2 of the safety data sheet (SDS), is also included in resources like the [toxicology directory](#).
- Contaminants present in products and their exposure limits. Where available, this information is presented in sections 3 and 8 of the SDS.

If the above information is not available for certain products, you can contact an occupational health specialist for assistance. Consult the sections on the services offered by the Réseau de santé publique en santé au travail (RSPSAT), the CNESST (Répertoire toxicologique) and its other joint sector-based associations (JSA).

⁹ A **fugitive emission** is defined as an unintentional leak or release of contaminants in various forms (solid, liquid, gas, vapours, fumes, mists, dust, etc. It is released by a piece of equipment, a machine, a process, a product, a substance or a hazardous material, and could expose a worker in the workplace.

3.1.4. Analyze the level of hazard of each contaminant

The goal of this stage is to assess the hazard level in terms of severity of health effects. The more serious the health effects of a contaminant, the more hazardous it is. The criteria required for this assessment are set out in the boxes below. They are based on the severity of health effects.

Highly hazardous

High-hazard contaminants are associated with at least one of the following characteristics:

- The SDS or label bears the warning “**Danger**” (e.g. corrosive or carcinogenic contaminants) and one of the following pictograms is present:



- Schedule I of the ROHS or a reference organization such as *the American Conference of Governmental Industrial Hygienists* (ACGIH) or the International Agency for Research on Cancer (IARC) indicate that contaminants are carcinogenic, sensitizing or toxic to hearing.
- Examples of contaminants or situations generating highly hazardous contaminants:
 - dusts and fibres: use or abrasive stripping of paint or metal dusts (lead), food flour
 - fumes: smelting, lead refining, vulcanization (rubber), welding
 - vapour and gases: coal tar, mercury, gasoline (benzene), wastewater treatment (decomposition of organic products), toluene, styrene, use of internal combustion engines (carbon monoxide)
 - aerosols: urethane automotive paint (isocyanates), glues and urethane insulation foam
- The contaminant emitted by the process could not be identified, or additional information is required.

Medium hazardous

Medium-hazard contaminants are associated with at least one of the following characteristics:

- The SDS or label bears the warning “Caution” and one of the pictograms is present:



- Examples of contaminants:
 - dusts and fibres: wood, stainless steel alloy depending on composition, ceramic fibres, vegetable fibres
 - liquid and vapour: ethyl alcohol
 - aerosols: cutting fluids during machining (always consult the SDS to determine the content and gauge the hazard level)

Low hazard

Low-hazard contaminants are associated with at least one of the following characteristics:

- The SDS or label bears the warning “Caution” (without a pictogram) or is not significant with a warning.
- Examples of contaminants:
 - dusts and fibres: cereals, sodium chloride.

If contaminants do not appear in the examples provided, or if information on certain contaminants is missing, you contact an occupational health specialist for assistance in analyzing the hazard level.

3.1.5. Assess the probability of worker exposure

This stage involves assessing the probability of worker exposure. While the level of risk is closely linked to the hazard level, it is just as closely linked to the probability of exposure. Thus, a highly hazardous material may not be prioritized if it is associated with low exposure. On the other hand, a less hazardous material could present higher risk if the worker is constantly exposed to it.

Assessing the probability of worker exposure can be carried out in a **qualitative** manner, depending on the information available on a given contaminant. In the event of uncertainty, it can be performed **quantitatively**.

Qualitative assessment

The boxes below set out the qualitative criteria for assessing a worker's exposure.

High probability of exposure

Work situations with a high probability of exposure are associated with at least one of the following characteristics:

- Contaminants are used in dispersive procedures (e.g. spraying, sawing, sandblasting, welding) or air dispersion (e.g. evaporation during drying, exhaust gas, decomposition gas, open process with significant vapour or gas generation).
- They are used in confined or restricted spaces with poor ventilation.
- The daily quantities used are very large (calculated in tons or cubic metres).
- They are used or produced more than 1,000 hours per year (more than 20 hours per week).
- Workers' exposure to these contaminants has been documented, measured or estimated in similar workplaces (e.g. literature, qualitative analysis, environmental analysis). It exceeds the permissible exposure value (PEV) in Schedule I of the ROHS, or a contaminant-specific guideline in the absence of a PEV.

Probability of moderate exposure

Work situations with a moderate probability of exposure are associated with at least one of the following characteristics:

- Contaminants are used in non-dispersive open processes (e.g. paint application by roller) or in open processes equipped with an enclosing corrective measure such as source capture.
- Daily quantities used are calculated in kilograms or litres.
- They are used or produced for 100 to 1,000 hours per year (2 to 20 hours per week).

Worker exposure to these contaminants is documented, measured or estimated (e.g. literature, qualitative analysis, environmental analysis) in similar workplaces. It is between half to the whole permissible exposure value (PEV) in Schedule of the ROHS.

Low probability of exposure

Work situations with a low probability of exposure are associated with at least one of the following characteristics:

- Contaminants are used in closed processes or are stored (not used).
- Daily quantities used are calculated in grams or millilitres.
- They are used or produced less than 100 hours per year (less than two hours per week).

Worker exposure to these contaminants is documented, measured or estimated (e.g. literature, qualitative analysis, environmental analysis). It is less than half the permissible exposure value (PEV) in Schedule 1 of the ROHS.

Quantitative assessment

When assessing exposure qualitatively is difficult, the exposure levels must undergo an environmental assessment. This assessment can involve, among other things, collecting air in the workers' breathing zone and comparing the results with thresholds deemed safe, or performing surface swab testing. The Réseau de santé publique en santé au travail (RSPSAT) offers sampling services. See section 6 for more information.

In Quebec, regulatory thresholds are defined in Schedule I of the ROHS. These are reference values for gases, dusts, fumes, vapours or mists that must not be exceeded in the workers' breathing zone. They take the form of weighted average exposure values (WAEVs), adjusted average exposure values (AAEVs), short-term exposure values (STEVs), ceiling values, excursion limits and, when several contaminants act on the same target organ, the sum of the fractions of the mixture (R_m). Some contaminants, such as recognized carcinogens and respiratory sensitizers, are also indicated as "EM." This means that exposure must be reduced to a minimum in accordance with Section 42 of the ROHS, even if the reference value is not exceeded.

In addition, international reference organizations, such as the *American Conference of Governmental Industrial Hygienists* (ACGIH) and the *National Institute for Occupational Safety and Health* (NIOSH), propose reference values based on thresholds that prevent the occurrence of adverse effects (critical health effects in the vast majority of workers). These non-regulatory thresholds can be used as guidelines for preventive or corrective action.

When sampling or taking samples, the methods used must comply with the *Sampling guide for air contaminants in the workplace* as well as the guidelines indicated in the substance datasheets, which can be found on the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) website. (See the section *For more information*.)

3.1.6. Assess the risks in order to prioritize them in the prevention program

Lastly, the information gathered in the previous stages is used to establish a risk level. To do this, the **hazard level** (point 3.1.4.) and the **probability of exposure** (point 3.1.5.) must be taken into account. The following table can be used to prioritize risks, and thus initiate the necessary corrective actions. This assessment will be carried out for each of the contaminants identified.

	Highly hazardous	Moderately hazardous	Slightly hazardous
High probability	High risk	High risk	Moderate risk
Moderate probability	High risk	Moderate risk	Moderate risk
Low probability	Moderate risk	Moderate risk	Low risk

A high-risk contaminant will need to be prioritized and dealt with immediately. A moderate-risk contaminant will need to be managed in the short term, while a low-risk contaminant will need to be managed in the medium to long term.

Particular attention must be paid to tasks that simultaneously expose workers to more than one hazard, whether chemical or physical (e.g. noise, vibration). In addition, all factors must be taken into account that could increase exposure time, such as atypical working hours. In these situations, a risk assessment by an occupational health specialist may be necessary.

3.2. Correct risks

Once the risks have been prioritized, the preventive measures already implemented, or those that should be implemented, must be assessed in order to eliminate, reduce or control the risks to workers' health. To do this, it will be necessary to base the assessment on the hierarchy of controls. A combination of measures is often more effective than a single one.

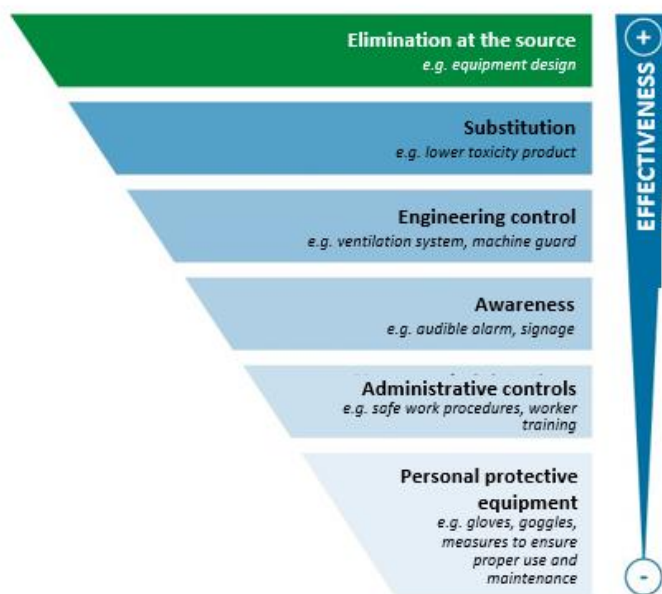


Figure 1: Hierarchy of controls

3.2.1. Elimination

The best way to protect workers is to eliminate exposure to a chemical contaminant. Elements that can be eliminated include raw materials, processes and equipment.

3.2.2. Substitution

When elimination is impossible, the possibility of substituting the product with a less toxic or even non-toxic alternative must be assessed. In the case of solvents, the IRSST's [Solub](#) substitution tool (in French only) can be used. Substitution can also apply to processes or equipment. This remains an effective risk prevention measure.

3.2.3. Engineering controls

Numerous engineering controls exist to reduce workers' exposure to contaminants. Several measures can be implemented, depending on the physico-chemical nature of the contaminant, the process or the equipment used.

- **Isolate the worker:** For example, the industrial process can be automated to enable the worker to perform high-risk tasks in isolation in a safe, ventilated enclosure.
- **Isolate the process:** For example, the process can be confined inside an adequately ventilated enclosure, particularly during abrasive air blasting (ROHS, s. 68).

- **Capture at source:** For example, a mobile or fixed extraction arm, a ventilated table or equipment with at-source exhaust can be used.
 - This corrective measure is mandatory for any localized source at a stationary work station that emits air contaminants (ROHS, s. 107). A source capture system where the air is recirculated into the work environment cannot be used in the presence of contaminants whose recirculation is prohibited (ROHS, s. 108.4).
- **Use wet methods in the process:** For example, use water with tools to reduce the dispersion and suspension of dust.
- **Add ventilation:** For example, general ventilation is increased to dilute the contaminant in the work environment.
 - This measure must be applied by natural or mechanical means: open windows to air the room, add a mechanical ventilation system, etc.

Engineering controls can be used when the quantity of chemical contaminants and their toxicity are low.

3.2.4. Awareness-raising

Signage is designed to make workers aware of the importance of risk with respect to health. Here are a few examples:

- [label](#) hazardous products used, use a poster to indicate hazardous residues or identify the presence of a hazardous product present in containers or in a piping system
 - Information for creating the label or poster can be found on the [safety data sheet](#) (SDS).
- delineate the area where high-risk tasks are carried out
- add signs to identify positions or tasks where personal protective equipment (PPE) (e.g. respiratory protective equipment [RPE], gloves, goggles) is mandatory

3.2.5. Administrative controls

Administrative controls make it possible for workers to carry out their tasks while limiting their exposure. Here are a few examples:

- implement hygiene measures such as prohibiting eating, drinking or smoking in work areas, washing hands and using a double changing room where required by regulation

- implement a policy of using engineering controls to reduce airborne contaminants
- rotate shifts in order to avoid exposure of the same workers to high-risk situations throughout the shift
- ensure preventive maintenance of tools, machines and equipment, and replace HEPA filters according to manufacturers' recommendations
- provide mandatory training such as WHMIS training

The employer must also take the necessary measures to protect the health of workers under the [AOHS](#) (ss. 51.3°, 51.9° and 51.10°):

- inform and train workers on safe work methods
- draw up instructions for organizing work, tasks and responsibilities in the presence of chemical contaminants
- oversee the wearing of RPE by establishing [a respiratory protection program \(RPP\)](#) (in French only) to ensure the appropriate use (depending on contaminant and exposure level, cleaning, maintenance, inspection and storage) of RPE

It's important to properly train workers on the risks posed by chemical contaminants. This training should cover at a minimum the following topics:

- identifying high-risk tasks
- exposure levels
- the effects on health
- hygiene measures to be followed
- safe work methods
- proper use of preventive measures to reduce or control risk (e.g. capture at source, wetting of materials, wearing and use of personal protective equipment (PPE))

Training must be tailored to all workers, including those exposed occasionally (e.g. temporary or agency workers, students, etc.). This training must be updated whenever there is a change in the workplace.

3.2.6. Measures and collective or personal protective equipment (PPE)

If the preventive measures in place are not sufficient or have not yet been implemented, PPE must be used to protect workers' health. However, the wearing of PPE such as respiratory protective equipment (RPE) should not be used to make up for a lack of collective equipment (e.g. local ventilation system) or to limit the use of RPE.

Measures for wearing RPE

- A fit test should be carried out before supplying a worker with respiratory protection.
 - For workers with beards, non-airtight respiratory protection is available, such as a loose-fitting hood, helmet or flexible mask with face shield.
- Ensure that workers wearing respiratory protection are well hydrated and take frequent breaks, especially when [working in the heat](#) (in French only).
- For more information, please consult the *Respiratory protection guide* (in French only) from the IRSST (see *For more information*).

General measures for wearing PPE

The nature of the tasks and contaminants may require the use of PPE. Therefore, it may be necessary to wear:

- gloves that are appropriate for the nature of the work when in contact with contaminants (e.g. irritating, corrosive or skin-sensitizing contaminants or those identified as “percutaneous” according to Schedule I of the ROHS)
- goggles or a shield that comply with regulations when exposed to hazardous materials that may cause an eye or facial injury (e.g. contaminants that are corrosive to the eyes and skin)
- protective footwear that comply with regulations when exposed to hazardous materials that can cause foot injuries (e.g. contaminants that are corrosive to skin)
- work clothing when exposure to contaminants is high and where required by regulation (e.g. lead, beryllium, asbestos, sandblasting), to prevent contamination outside the work area:
 - The employer is responsible for maintaining such clothing which must not be taken home by workers.
 - You can consult the guide [Clothing providing solid particle protection](#) (in French only) published by the CNESST for details on selecting, inspecting and wearing protective clothing, as well as methods for its safe removal and disposal (discarding or cleaning).

The materials used to make gloves and protective clothing have a wide range of properties. They should be chosen according to the products used. To facilitate this choice, see:

- section 8 of the [safety data sheet](#) (in French only)
- the [ProtecPo](#) utility offered by the IRSST
- the [Protective glove selection guide](#) (in French only) from the IRSST
- the [Toxicological directory](#) (in French only)
- product suppliers or manufacturers

3.3. Control risks

Once the corrective measures have been implemented, the employer, in collaboration with the workers, must ensure that they remain in place permanently and that they are effective. Control measures can be implemented. They may vary according to the contaminant type (aerosols, vapours or gases).

General control measures

- Plan preventive maintenance on machines, equipment, tools, ventilation systems and reusable personal protective equipment (PPE) according to the manufacturer's recommendations.
 - It is important to bear in mind that the maintenance of machines, tools, ventilation systems or other equipment can expose workers to high levels of contaminants. Adequate protection is therefore essential.
- Regularly reassess the possibility of implementing corrective measures to further reduce exposure levels for workers.
- Identify new work situations where exposure to a contaminant presents a high or moderate risk.
- Implement a purchasing policy that favours equipment that limits the emission of chemical contaminants into the air.
- Implement policies for cleaning surfaces and changing equipment filters.
- Evaluate and update the respiratory protection program (RPP) annually.
- Regularly remind workers of procedures and best work practices.
- Train new workers to recognize high-risk tasks and make appropriate use of preventive measures.
- Carry out inspections to validate the appropriate use of preventive measures by workers and the proper functioning of equipment.

- Monitor workplace quality through air and surface sampling or biological exposure monitoring, where applicable.
 - In particular, air sampling must be carried out annually in all establishments with 50 or more workers and for all contaminants likely to exceed the permissible exposure values (PEVs) listed in Schedule I (ROHS, s. 43).

4. FIRST AID

The organization of first aid must comply with the [First-aid Minimum Standards Regulation](#). An [analysis tool](#) for determining the type of [first aid](#) kit needed is available (in French only).

The measures to be taken may vary according to the contaminant type. Some contaminants have special characteristics, and first-aiders need to be ready to intervene as the situation demands. It may be necessary to call on specialized emergency services. The poison control centre can also be consulted as needed. For effective organization of first-aid services, it is recommended that:

- first-aiders be able to quickly consult the safety data sheets (SDS) for the products used. Section 4 (first aid) of the SDS describes all the steps to be taken to treat an injured person;
- an emergency measures plan be drawn up, including an emergency evacuation plan and an evacuation protocol for injured persons in situations requiring it;
- the appropriate protective equipment for first-aiders be determined, depending on the contaminant (e.g. appropriate respiratory protection, type of glove adapted to the contaminant, safety glasses);
- confined space workers and first-aiders receive additional training if contaminants require special measures (e.g. protocol for the presence of asphyxiants (such as cyanides) or for the use of oxygen);
- emergency equipment and additional first-aid supplies be selected based on an assessment of the risks:
 - **Emergency equipment for rinsing eyes and skin** is required for severe irritants or corrosives and toxic substances depending on the risks present (ROHS, ss. 75-76). For more information, you can consult the data sheet [Emergency equipment - Eye and skin rinsing skin](#) (in French only).
 - **An antidote:** For example, skin exposure to hydrofluoric acid requires application of 2.5% calcium gluconate gel to the skin.
 - **Oxygen:** The use of oxygen is recommended in establishments where asphyxiating (e.g. cyanide) or corrosive (e.g. ammonia, chlorine) products are present. It is important to take into account certain elements concerning the [use of oxygen](#).

5. MEDICAL SURVEILLANCE

To prevent certain illnesses resulting from exposure to chemical contaminants, screening or medical surveillance activities may be recommended. Any screening carried out in the context of medical surveillance of workers exposed to contaminants must be performed in accordance with the professional practice guides established by the Communauté médicale de pratique en santé au travail du Québec (santeautravail.qc.ca). Workplaces should contact their occupational health team or an occupational health physician, who will be able to determine whether screening or surveillance is necessary, taking into account the worker's exposure and work history. Screening should always be carried out in conjunction with the preventive measures required.

In addition, the [*Practice guide concerning the worker's free and informed decision in the context of occupational health screening or medical surveillance*](#) (in French only) should be applied during medical surveillance.

6. SERVICES OFFERED BY RSPSAT TEAMS

The Réseau de santé publique en santé au travail (RSPSAT), together with its partners and in accordance with its legal mandates under the *Act respecting occupational health and safety* (AOHS), the *Public Health Act* (PHA) and the *Act respecting health services and social services* (AHSSS), works to prevent and protect workers' health by supporting workplaces in meeting their obligations to prevent occupational illnesses. The RSPSAT has multidisciplinary teams (medical, nursing, occupational hygiene, ergonomics, psychosocial risks, etc.) with expertise in occupational health that are entirely funded by the Fonds de la santé et de la sécurité du travail. It has been offering its services free of charge throughout Quebec since the adoption of the AOHS in 1979.

More specifically, with regard to chemical risks, the RSPSAT can:

- help identify and analyze health risks in order to prioritize them
- offer an environmental assessment to help document initial exposure or when there are process changes
- inform workers about the health effects of products or mixtures
- support and advise the community on preventive measures to be implemented or already in place
- assess the effectiveness of preventive measures implemented
- support the workplace in maintaining these measures
- support employers in the organization of first aid
- provide medical supervision, where appropriate

To request support or find out more about the services offered by the occupational health teams, consult www.santeautravail.qc.ca.

7. SERVICES OFFERED BY THE CNESST AND ITS OTHER PARTNERS

The CNESST also publishes the [Toxicological directory](#) (mainly in French but with some English information) to inform workplaces about the health effects of contaminants and preventive measures. A telephone hotline is also available when additional information is required.

The CNESST's other [partners](#) contribute in many ways to supporting workplaces in managing OHS. The [joint sector-based associations](#) (JSAs) provide their members with services:

- advice and personalized assistance
- training and information
- research and development on the prevention of occupational accidents and illnesses

If you're linked to a JSA, you can find out about the specific services it offers its members.

The IRSST provides an instrument loan, calibration, repair and analysis service for chemical and toxicological contaminants (biological exposure monitoring).

8. FOR MORE INFORMATION

8.1. Additional information for workplaces

Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST)

- [CNESST, WHMIS 2015 - Guide to using a safety data sheet](#) (in French only)
- Manual on first aid in the workplace - 9th edition (in French only)
<https://www.cnesst.gouv.qc.ca/fr/organisation/documentation/formulaires-publications/secourisme-en-milieu-travail>

Réseau de santé publique en santé au travail (RSPSAT)

- RSPSAT, analysis tool: [First aid - RSPSAT \(santeautravail.qc.ca\)](http://santeautravail.qc.ca) (in French only)
- RSPSAT, type of kit: [KIT Sheet 2 - RSPSAT \(santeautravail.qc.ca\)](http://santeautravail.qc.ca) (in French only)
- RSPSAT, data sheet: Emergency equipment - Eye and skin rinsing: [Emergency - RSPSAT \(santeautravail.qc.ca\)](http://santeautravail.qc.ca) (in French only)
- RSPSAT, data sheet: Oxygen - First aid: [Oxygen - RSPSAT \(santeautravail.qc.ca\)](http://santeautravail.qc.ca) (in French only)
- RSPSAT, Occupational hazards by trade available on the RSPSAT portal: [Directory of occupational hazard by trade - Publications - RSPSAT \(santeautravail.qc.ca\)](http://santeautravail.qc.ca) (in French only)
- RSPSAT, Forklift and carbon monoxide page: <https://santeautravail.qc.ca/dtp-activite-entretien-chariots> (in French only)
- RSPSAT, Respiratory protection page: <https://santeautravail.qc.ca/dtp-intervention-protection-respiratory> (in French only)
- RSPSAT, Chemical risks files: <https://santeautravail.qc.ca/dtp-Risques%20chimiques> (in French only)

Laws and regulations

- [Act respecting occupational health and safety \(AOHS\)](#)
- [Regulation respecting occupational health and safety \(ROHS\)](#)
- [Hazardous Products Information Regulation \(HPIR\)](#)
- [First-aid Minimum Standards Regulation \(FMSR\)](#)

8.2. Additional information for specialists

Réseau de santé publique en santé au travail (RSPSAT)

- Groupe de travail sur le consentement éclairé en santé au travail, [*Practice guide concerning the worker's free and informed decision in the context of occupational or medical supervision*](#), (in French only) 2019.
- [Institut national de santé publique du Québec \(INSPQ\)](#)

Institut de recherche Robert-Sauvé en santé et en Sécurité du travail (IRSST)

- Capucine Ouellet and Charles Labrecque, [Respiratory protection guide](#), 2023 (in French only).
- Daniel Drolet and Guylaine Beauchamp, [Sampling guide for air contaminants in the workplace \(8th edition, version 8.1, updated\) \(irsst.qc.ca\)](#), 8th edition (version 8.1), 2012.
- Substance datasheets, [Workplace Air Contaminants Sampling Guide \(irsst.qc.ca\)](#)
- IRSST's Solub tool, [Solub homepage - Workplace solvent substitution process \(irsst.qc.ca\)](#) (in French only)
- IRSST's ProtecPo tool, [ProtecPo homepage \(inrs.fr\)](#) (in French only)
- IRSST protective glove selection tool, [Assistance selecting protective gloves \(irsst.qc.ca\)](#) (in French only)

The CNESST and the MSSS would like to thank the following partners for their participation in the development of occupational health programs:



ASSOCIATIONS
SECTORIELLES
PARITAIRES

Institut national
de santé publique
Québec



irsst



Réseau de santé publique
en santé au travail

Québec



Santé Québec

For general information, [contact the CNESST](#).

APPENDIX

Depending on the complexity of your workplace, you may choose to complete a single table if similar risks exist in several departments or workstations.

Process/task	Product/contaminant	Emission type	SDS available	Risk (assess the most hazardous contaminant(s))				Preventive measures in place/to be put in place
				Hazard level	Probability			
					High	Medium	Low	
				High	High	High	Medium	
				Medium	High	Medium	Medium	
				Low	Medium	Medium	Low	
				Hazard level	Probability			
					High	Medium	Low	
				High	High	High	Medium	
				Medium	High	Medium	Medium	
				Low	Medium	Medium	Low	

Examples

Process/task	Product/contaminant	Emission type	SDS available	Risk				Preventive measures in place/to be put in place
Thermopane window installation	PL DOOR (Toluene-2,6-diisocyanate)	Vapour	Yes	Hazard level	Probability			Outdoor use or adequate ventilation of the room during installation
					High	Medium	Low	
				High	High	High	Medium	
				Medium	High	Medium	Medium	
				Low	Medium	Medium	Low	
Manufacture of MDF mouldings	MDF wood panels	Dusts	No	Hazard level	Probability			Enclosing the moulder, at-source exhaust on the moulder
					High	Medium	Low	
				High	High	High	Medium	
				Medium	High	Medium	Medium	
				Low	Medium	Medium	Low	