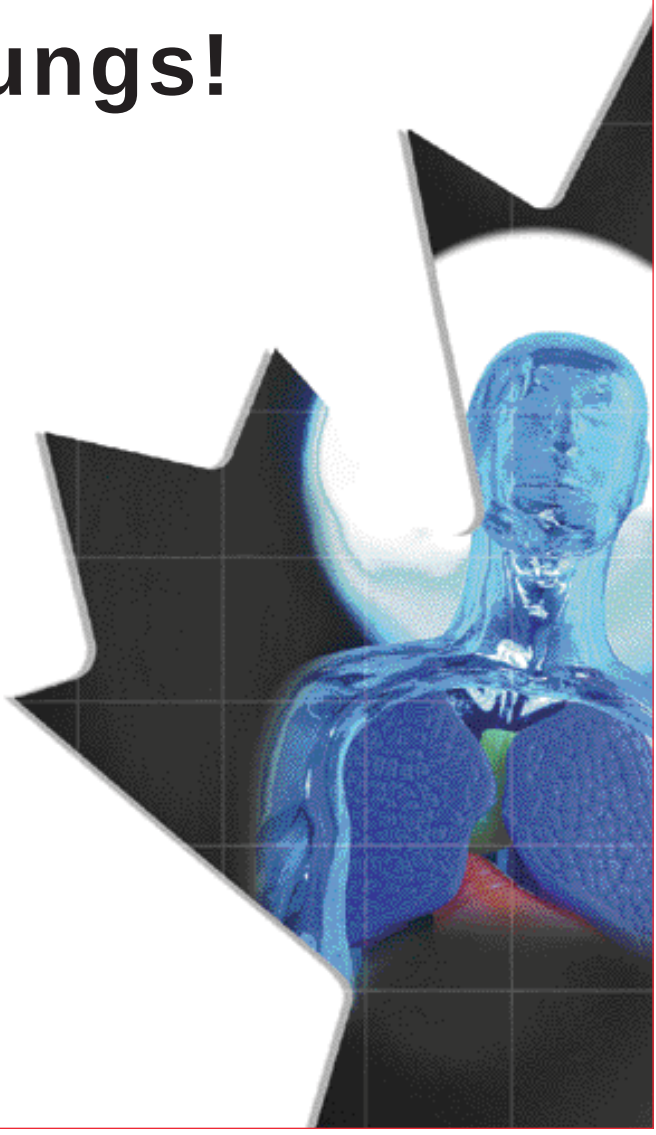
LABOUR PROGRAM

Protect Your Lungs!



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Protect Your Lungs!

In the present document, we would like to introduce some basic information regarding respiratory protection devices and how to use them. The majority of the information quoted comes from the **Canadian Standards Association** standard number CSA Z94.4, entitled *Selection, Use and Care of Respirators*. The standard covers all aspects of respiratory protection applicable in the majority of industries and workplaces. If your work requires you to wear any kind of respiratory protection device, you must read it and implement its recommendations in practice.

Air Contamination

The air that you breathe in is never “100% clean”. To give an example, in your own home, your lungs are attacked by cooking smells, carpet deodorizers, chlorine in bleach, cigarette smoke or dead skin cells from animals. In your yard or on the street,

car exhaust, household and industrial smoke, smell of freshly cut grass, tree resin, fungus dust, flower pollens and dust taken by wind, are omnipresent. Moreover, some types of work generate substantial amounts of atmospheric contaminants. For example, spraying with pesticides, washing with solvents, grinding metal, transferring wheat on a feeder, painting with a spray gun or arc welding belong to this group.

Sometimes, even if you try to do all you can in order to eliminate the contaminants or to replace them by less toxic substances and reduce their concentration in the air; you still have to do something

in order to improve the quality of air you are breathing. In these circumstances, you have to wear a mask and if a mask is not enough, you have to use a source of fresh air.

NOTE:

Always remember: Wearing a respiratory protection device does not mean that you are safe. The atmosphere that surrounds you at work still remains dangerous.

Learn to Manage the Danger

Contrary to other risks present in the workplace, it is often hard to know if there are any dangerous substances in the air. What can be done? Learn to control the potential risks by yourself.

Knowing the Contaminants

In order to know a contaminant well, you have to be aware of four aspects:

- Its name and physical state;
- Its toxic effects;
- Its characteristics for sensory detection;
- Its characteristic for cutaneous absorption and of eye irritation.

Its name and physical state

Learn the exact names of substances, products and materials you are using, from products used for the procedure to those emitted into the air. Each substance has its own toxicity.

Identify the physical state of these contaminants. Different types of respirators are used depending on whether the contaminant is in the form of particles or gas.

NOTE:

Each respiratory protection device is designed to protect you only from a specific type of risk.

Its toxic effects

Obtain information regarding the toxic effects that substances can cause based on their concentration. Some substances are irritants and you will become aware of them once you are exposed to them. Many are invisible and odourless at low concentrations and do not cause any tingling skin sensation, lacrimation, nose and mouth irritation, impact on taste, anxiety or sleepiness. Therefore, it is almost impossible for you to detect them.

Its characteristics for sensory detection

You have to know at which concentration you are able to detect the smell, taste or irritating effects of these substances. Automatically, you will have an idea of the concentration level in the air you are breathing.

Its characteristic of cutaneous absorption and of eye irritation

Moreover, some substances can get through your skin or irritate your eyes. The substances that get through the skin are clearly identified in the document *TLVs and BEIs* /*Threshold Limit Values and Biological Exposure indexes*/ from the ACGIH /*American Conference of Governmental Industrial Hygienists*/ and are marked by the annotation “Skin”. If this is the case or if the substances irritate the eyes, you

have no choice but to wear suits impermeable to these substances and a mask that covers the face or allows you to wear unventilated glasses.

NOTE:

Beware of contaminants that can get through your skin. You can be poisoning yourself even if your respirator is adequate.

Most of this information can be found on the data sheet of the given product (Material Safety Data Sheet or MSDS). Always keep it handy.

Know Your Respirator

It is crucial to know the functioning, restrictions and functions of the respirator you use.

In order to protect yourself from exposure to particles, it is usually enough to pass the contaminated air through a cloth screen or polyester foam that would block them. They all carry the approval number TC-21C. Some of them are generic and may be used for protection against many particle contaminants. Others are more specific and are to be used only in the case of very specific contaminants: silica, blasting-related dust, asbestos, radon, mist, smoke, etc. Some of them are efficient in any kind of environment, while the efficiency of others is substantially decreased in the presence of oils that wet the filtering tissue and remove its static electricity.

It is not as easy to invent a filter capable of filtering gaseous contaminants. As a rule, the air is passed through clay grains, silica gel, activated

charcoal or special plastics capable of absorbing the contaminants. These grains are kept in a cartridge or filter cartridge.

Cartridge respirators carry the approval number TC-23C and the gas masks have the number TC-14G. Within this group, there are generic cartridges capable of absorbing various kinds of gases and a series of specific cartridges for chlorine, paint, pesticides, sulphur dioxide, ammonia, carbon monoxide, etc.

Some gases are practically non-toxic, but they can replace the air, to the point that the oxygen level drops causing suffocation. If the oxygen percentage falls below 19.5%, it is considered to be dangerously low and you have to breathe air delivered by a pump or from bottles. These are supplied air respirators (TC-19C) and independent respirators (TC-13F).

Know the Environment Risk Level

Some types of environments are extremely dangerous. They pose an immediate risk to life and can have harmful and irreversible health effects. They may also incapacitate you when you try to leave the contaminated area. They are listed below:

- Atmosphere containing a known contaminant at a concentration close to the IDLH (immediate danger to life and health) level. A list of substances that are IDHL is published in the *Pocket Guide to Chemical Hazards* of the US **National Institute for Occupational Safety and Health** (NIOSH).
- Atmosphere containing a contaminant that is known and very toxic at an undetermined concentration. Carcinogens and substances that deposit themselves in the lungs without breaking down, such as silica or asbestos, are considered as particularly toxic.
- Atmosphere containing an unknown contaminant.
- Atmosphere where the oxygen level is below 19.5%.
- Atmosphere of a close contaminated space.

- Atmosphere containing contaminants at a concentration equal to or exceeding LEL (lower explosive limit). The book *Dangerous Properties of Industrial Material* by Sax, which is available in specialized libraries, lists the LELs.

- Atmosphere filled with fire smoke.

In order to enter these types of atmospheres, you must wear an independent respirator equipped with an air bottle.

NOTE:

To be able to wear an independent respirator, you have to take a special course. You have to participate in the course at least once a year and it must include instruction and hands-on activities covering the issues of respiration control, as well as instruction in simulated use.

In order to know the risk posed by a given kind of atmosphere, its risk factor (RF) is calculated by dividing the contaminant's concentration in the air by its occupational exposure limit (OEL). By definition, the occupational exposure limit is the contaminant level to which you can be exposed continually, day after day during your whole working life without experiencing any negative health effects as a result. For companies under federal jurisdiction, the OEL is called TLV or *Threshold Limit Value* and is determined by the **American Conference of Governmental Industrial Hygienists.**

NOTE:

RF = concentration in the air / OEL

RF indicates by how many times the OEL is exceeded. Clearly, the higher this number, the more dangerous the atmosphere is. If there are many contaminants in the air, you have to calculate as many RFs as there are substances.

NOTE:

Never enter a contaminated atmosphere if you do not know its risk factor.

Use of a Respirator

Respirator Approval

Wear only the approved respiratory protection devices. For companies under federal jurisdiction, only the respirators approved by the NIOSH and listed in the *Certified Equipment List* are authorized.

NOTE:

During the approbation procedure, the NIOSH determines a typical protection factor (TPF) for each respirator. The TPF of a given respirator must always be higher than the highest risk factor (RF) of all the contaminants present.

Face Adjustment

It is important that the respirator's mask be well adjusted to your face. Very often, men are required to be clean-shaven before using the device. Learn how to adjust the mask on your face and how to remove it and check the adjustments and seals before putting the mask on. Once you have the mask on, check the seals using the method established by your employer. Often, the chosen verification method would involve irritating smoke or a strong-smelling vapour, or under-or over-pressure tests.

NOTE:

A respirator that is not well-adjusted to your face diminishes the TPF. You won't know any more if you are well protected or not.

Replacement

All particulate filters have a limited lifetime. Once the filter is clogged or you have hard time breathing, you have to replace it. There are disposable filters for short-time tasks.

All cartridges and filter cartridges have a limited lifetime. Once all grains are saturated, they no longer block gas contaminants, which pass right through them. There are three ways of determining when you can no longer use your cartridge or filter cartridge.

First method: Some respirators (especially filter cartridges) are equipped with a small window, which changes colour once the grains become saturated. Once the color changes, replace your filter cartridge.

Second method: Your employer can establish a replacement schedule based on concentration of contaminants in the air during your work time in this contaminated atmosphere. Once the established time of usage elapses, replace your cartridge of filter cartridge.

Third method: Some substances have typical characteristics for sensory detection at concentrations equal to or lower than their OEL. Once you smell or taste the contaminant or as soon as you start feeling a certain irritation, replace your cartridge or filter cartridge.

NOTE:

Never use a cartridge or box respirator if you do not know when it needs to be replaced.

Emergency and Rescue

Know what to do in case your respirator becomes defective, or when a power failure, an uncontrollable chemical reaction, fire, explosion or a human error occurs.

You have to know how to leave the contaminated area and the amount of time that it will take you. If needed, equip yourself with an emergency mouth respirator or a rescue air tank.

Many disasters happen during rescue operations. Stress levels are at their maximum, people are panicking and orders flow in from everywhere. Know what to do. Make sure you have plenty of emergency devices close to you.

Cleaning, Inspection, Maintenance and Storage

A respirator may be compared to an additional lung. You would never leave your lung on a shelf, exposed to free air, sun, cold, oil, mouse droppings, etc. The same applies to your respirator.

- Store your respirator in a clean place, in a hermetically closed bag.
- Wash it regularly and disinfect when needed.
- Check the replacement schedule.
- Make sure that the regulators, warning devices and alarm systems are in good working condition.
- Check your air tanks, if necessary.
- Check if all parts are present and are in good state. Otherwise, replace them.

CAUTION: The NIOSH approval is valid only for a complete respirator unit, which includes the straps, valves, face pieces, cartridges, boxes or filters, and air duct lines, if applicable. If you replace one of the above-

listed pieces, parts or cartilages by one from another respirator from another type, the unit is no longer approved. For example, you cannot use a brand X cartridge for a Y brand respirator even if you can screw them on together. For each type of respirator, the manufacturer provides a list of pieces, parts and cartilages approved by the NIOSH and which can be joined together. Consult the list in order to be sure that you are protected.

NOTE:

Wearing a respirator that does not protect you from the contaminants you are exposed to or does not protect you sufficiently can be very dangerous for your life, health and security.

Medical Examination

Medical examination is required for firefighters and persons who must wear independent respirators. For other workers it is up to the employer's discretion to decide whether their health or physical condition may prevent them from using a respirator. In these circumstances, you have to check with your physician who should inform your employer if you can wear a respirator. The results of medical tests remain confidential.

Bibliography

You can obtain the documents mentioned in the present brochure at the following locations:

CSA Z94.4-02 Selection, Use and Care of Respirators
Canadian Standards Association
5060 Spectrum Way, Suite 10
Mississauga, Ontario
L4W 5N6
Tel: 1-800-463-6727 or 416-747-4044
www.csa.ca

RTECS Data Bank
Canadian Centre for Occupational Health and Safety
135 Hunter East Street
Hamilton, Ontario
L8N 1M5
Tel: 1-800-263-8466 or 905-572-4400
Fax: 905-572-4500
www.cchst.ca

TLVs and BEIs
ACGIH
1330 Kemper Meadow Drive
Cincinnati, OH 45240-1634
Tel: 513-742-2020
Fax: 513-742-3355
www.acgih.org

NIOSH Certified Equipment List
NIOSH Pocket Guide to Chemical Hazards
NIOSH Publications
4676 Columbia Parkway
Cincinnati, OH 45226-1998
Tel: 1-800-356-4674
Fax: 513-533-8573
www.cdc.gov/NIOSH/homepage.html

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