# CHEMICALS AND OTHER HAZARDS IN PAINTING

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## Activity 1: Icebreaker – The Coin Race

Divide participants in two groups and have them stand in 2 lines. Each group will have to put a coin under their shirts and let it drop down to the floor. Starting from the first person of the line until it reaches the last person. Whichever group finishes first wins the round. The group that loses the round has to answer a question. The race is repeated until all the questions have been answered. This activity serves as an icebreaker and also as a pre-test.

## Introduction:

Among the many types of jobs that day laborers perform, painting is one that most workers often do. Whether workers are painting the interior or exterior of a house or building, there are some hazards that workers should be aware of to prevent illnesses and injuries.

In this training, workers will learn:

- To identify hazards associated with the job of painting, such as exposure to chemicals, working at heights and uncomfortable working positions, among others.
- To learn about the dangers associated with the use of chemical products, the symptoms of being exposed to chemicals and first aid measures.
- To provide preventative measures workers can adopt to protect themselves from hazards in painting.
- To provide information on how to read chemical labels to use chemical safely.

As mentioned before, a painter applies paint and other decorative finishes to interior and exterior surfaces of buildings and other structures. The painter is primarily responsible for preparation of the surface to be painted, such as patching holes in drywall, using masking tape and other protection on surfaces not to be painted, applying the paint and then cleaning up.

Ask participants: Can you think of any other tasks that painters do? Let participants respond and write the answers on butcher paper.

Some of the answers may include:

- Prepare surfaces to be painted (includes scraping, removal of wallpaper, etc.).

- Determine what materials will be needed.
- Use, clean and maintain various equipment.
- Mix paintings.
- Supervise apprentices or other workers.

Ask participants to share if they have had any incidents when working with paint. Allow time to hear their stories and keep a note of the incidents, as those stories will be used to illustrate the hazards that workers are exposed to in the industry of painting.

**Activity 2: Learning the Hazards**

Explain to participants: Painters can work at a variety of workplaces, construction sites, homes, renovation, etc. and constantly face different hazards. There are many work place issues that can affect potential exposure to hazardous materials used by painters. By considering the main issues and taking some action, employers and workers can more effectively reduce workers' exposure to the hazardous products.

A hazard is the potential for harm (physical or mental) to the health and safety of people.

Work hazards can be divided in the following categories. (For each category, ask participants to give you examples). Participants will be able to look at images that represent each hazard.

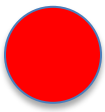
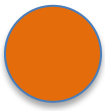
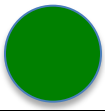
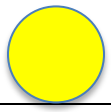
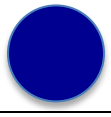
- **Safety hazards** can cause immediate accidents and injuries. Examples are hot surfaces, broken ladders, and slippery floors. Safety hazards can result in burns, cuts, broken bones, electric shock, or death.
- **Physical hazards** are factors within the environment that can harm the body without necessarily touching it. Physical Hazards include: radiation, high exposure to sunlight/ultraviolet rays, extreme temperatures and constant loud noise.
- **Chemical hazards** are present when a worker is exposed to any chemical preparation in the workplace in any form (solid, liquid or gas). Some are safer than others, but to some workers who are more sensitive to chemicals, even common solutions can cause illness, skin irritation, or breathing problems. Examples include cleaning products, asbestos, and pesticides.
- **Biological hazards** are associated with working with animals, people, or infectious plant materials. Work in schools, day care facilities, colleges and universities, hospitals, laboratories, emergency response, nursing homes, outdoor occupations, etc. may expose you to biological hazards. They include viruses, bacteria, mold, body fluids, animal droppings, plants, etc.
- **Ergonomic hazards** occur when the type of work, body positions and working conditions put strain on your body. They are the hardest to spot since you don't always immediately notice the strain on your body or the

harm that these hazards pose. Short-term exposure may result in "sore muscles" the next day or in the days following exposure, but long-term exposure can result in serious long-term illnesses. Some of the hazards include frequent lifting, poor posture, awkward movements, repeating the same movements over and over, having to use too much force, etc.

- **Work organization hazards** are hazards or stressors that cause stress (short-term effects) and strain (long-term effects). These are the hazards associated with workplace issues such as workload, lack of control and/or respect, etc. Examples of work organization hazards include workload demands, intensity and/or fast pace, respect (or lack of), sexual harassment, etc.

BEWARE: some hazards can cause immediate damage, such as the safety hazards or chemicals that can cause skin eruptions, but sometimes the symptoms of an illness can appear months or years after.

Using the color category table provided, and color dot stickers, ask participants to stick color dots that correspond to the type of hazard that each represent. And ask them to explain why they chose the categories of hazards they did.

| **Type of Hazard** | **Color** |
|---|---|
| Safety Hazards |  |
| Physical Hazards |  |
| Chemical Hazards |  |
| Biological Hazards |  |
| Ergonomic Hazards |  |
| Work Organization Hazards |  |

Here are the hazards to be categorized:

- Working at heights.
- Using ladders, platforms and scaffolds.
- Working in confined spaces.
- Risk of eye injury.
- Slips, trips and falls.
- Risk of injury from falling objects.
- Exposure to mold, fungi and bacteria.
- Exposure to bird and rodent droppings.
- Exposure to paint products, solvents, lead and other toxic substances.
- Proximity to flammable or combustible materials.
- Working in awkward positions, or performing repetitive physical tasks.
- Standing for long periods of time.
- Lifting heavy or awkward objects.
- Exposure to heat and ultraviolet radiation.
- Noise.
- Stress.
- Breathing toxic materials.
- Electrical hazards from working close to live electrical power lines or equipment.
- Shift work or extended work days.
- Working at a fast pace.

*Note:* Have the hazards written on butcher paper prior to the training so that you do not have to write them on the spot. More hazards can be added.

**Activity 3: Let's Understand Chemicals**

Explain to the participants: Nowadays, the use of chemicals has spread to almost all branches of work activities; therefore, there are risks in many work places and in particular in the trade of painting. There are thousands of chemical substances that are used in large and small quantities, and there are many new ones introduced each year. Unfortunately, most people do not know how to read labels on chemical products or handle them with the necessary precautions. However, it is your right to know and it is important to be well informed of the correct and safe use of chemicals at the workplace.

The first and most essential step leading to the safe use of chemicals is to know what they are used for and to understand the hazards they pose to your health and the environment, in order to be able to control them. Workers must have the information of the chemicals they are going to use, as well as the hazards they pose and safety measures.

**Does anyone know what chemicals are used in paint and what are they used for?** Paint contains several kinds of material: pigments, binders, extenders, solvents and additives. The additives themselves can include a vast array of materials, such

as dispersants, silicones, thixotropic agents, driers, anti-setting agents, bactericides, and fungicides and algaecides.

All the pigments in paint are used to set the color and opacity. The binder, or resin, holds the pigment in place. With the extender, large pigment particles are added to improve adhesion, strengthen the film and save on binder. There is also the solvent or thinner, which can either be organic or water, that is used to reduce the thickness of the paint to make its application better and easier. Along with those base ingredients, the additives within paint consists of several substances. For example, there are also silicones, which are used to improve the paint's weather resistance and driers are placed in paint to accelerate the drying time. Anti-settling agents are used in paint to prevent pigment settling. The final additives in paint are the fungicides and algaecides, which are used to protect exterior paint from molds, algae and lichen.

After reviewing the materials in paint, explain to participants that:

**Chemicals** are organic and inorganic substances, they may be natural or synthetic, toxic or not and they can harm people or the environment.

**Hazardous chemical products** are those that can harm people or the environment.

Every day we are exposed to countless chemical products that have become essential in our life but unfortunately we are not informed about their effects and consequences. Even nowadays, the possible effect that many products can produce on people's health and on the environment is not exactly known.

**Physical Form of Chemicals:** The physical form of a chemical can influence the way in which it enters the organism, and to some extent, the harm it causes. The main physical forms of chemicals are solids, dusts, liquids, vapors and gases.

***Solids***

- Solids are the least likely of the chemical forms to cause chemical poisoning. However, certain chemical solids can cause poisoning if they get onto your skin or food and you then ingest them.

- Personal hygiene is important to prevent the ingestion of chemical solids.

- The greatest danger with solids is that some work processes can change them into a more dangerous form.

***Liquids***

- Many hazardous substances, for example acids and solvents are liquid in room temperature.

- Many liquid chemicals detach vapors that can be inhaled.

- The skin can absorb liquid chemicals. Some liquid chemicals can damage the skin immediately. Other liquids go on directly through the skin to the bloodstream, from which they can transfer to different parts of the organism and have harmful effects.

- It is necessary to apply control measures for liquid chemicals to eliminate or to diminish the possibility of inhalation, exposure to the skin and damage to the eyes.

***Vapors***

- The steams are droplets of liquid suspended in the air.

- A lot of chemical liquid substances evaporate at room temperature, which means that they form a vapor and remain in the air.

- Vapors from some chemicals can irritate the eyes and the skin.

- The inhalation of certain chemical toxic vapors can have different serious health consequences.

- Vapors can be flammable or explosive. To avoid fires or explosions, it is important to keep the chemical substances that evaporate far from heat sources.

- There should be control measures to avoid exposure of workers to the vapors that emit from liquids, solids or any other state of chemicals.

***Gases***

- Some chemicals are in the form of gas at room temperature. Other chemicals, in liquid or solid form, turn into gases when they warm up.

- It is easy to detect some gases for based on their color or smell, but there are other gases that cannot be seen nor smelled, and they can only be detected through the use of special equipment.

- Gases can be inhaled.

- Some gases produce irritating effects immediately. The effects that other gases have in the health of people can only be identified once the health of the individual has been seriously compromised.

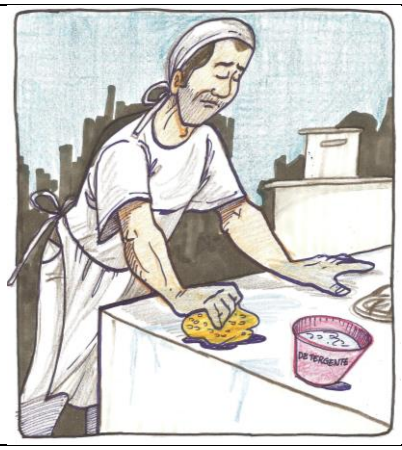
- Gases can be flammable or explosive. It is necessary to be cautious when working in a place where there are explosive and flammable gases. For example, when working with a gas paint spray gun, it is important to keep any ignitions sources away from your work area. Or when welding, it is important to not work near the welding cylinder storage.

- Workers should be protected at the workplace from the possible hazardous effects of chemical gases through efficient control measures.

Note: Working in confined spaces like boilers and tanks is especially dangerous because they have low oxygen and/or high amounts of toxic chemicals.

**Routes of entry to the organism of chemical pollutants**

| | | |
|---|---|---|
| **RESPIRATORY ROUTE through the nose and the mouth, the lungs, etc.** |  | This is one of the most important routes of entry or penetration because it is through the air that many toxic substances such as dust, smokes, aerosols and gases can enter our bodies. |
| **DIGESTIVE ROUTE through the mouth, stomach, intestines, etc.** |  | Route of entry through the mouth, the esophagus, the stomach and the intestines. Pollutant ingestions dissolved in mucus in the respiratory system should also be considered. |
| **PARENTERAL ROUTE through open wounds, sores, etc.** |  | Route of entry of the pollutant to the body through open wounds, sores, etc. |

| | | |
|---|---|---|
| **DERMAL ROUTE through the skin** |  | Route of entry of many substances that are able to go through the skin without causing erosion or noticeable alterations and that can enter the blood to later be spread to the whole body. |

**Activity 4: Controlling Chemical Hazards**

**Chemical Labeling – How to read them!**
Tell participants: Health and safety information on chemical substances is public, so you have the right to ask for the facts!

OSHA's Hazard Communication standard requires chemical manufacturers or importers to classify the hazards of chemicals, which they produce or import. Also, it requires all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, safety data sheets, and information and training.

Explain to the participants that OSHA defines a hazardous chemical as anything that is a physical or health hazard.

Physical hazards are pretty straightforward. They include flammable and combustible liquids, compressed gasses, explosives, etc.

Health hazards are a little harder to determine, however OSHA indicates they include pollutants that can cause the following: cancer; birth defects, sensitivity, irritation, damage to the nervous system, damage to different organs (such as the liver, kidneys, lungs, skin), damage to the eyes and mucus membrane, agents of the system that produce blood in our bodies.

We have stated before that most of us are exposed to chemicals in one way or another, but how many of us can read a label and understand it? Have any of you read the labels of the chemicals we use?

Using labels from different chemical products, ask participants to name the information they notice. Write them on a sheet of butcher paper.

After, go over the different elements of information that a label on a hazardous chemical should have according to OSHA's Hazard Communication Standard (HCS):

1. The **Name, Address and Telephone Number** of the chemical manufacturer, importer or other responsible party.
2. The **Product Identifier** is how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in section 1 of the SDS.
3. **Signal Words** are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the signal word "Warning," then only "Danger" should appear on the label.
4. **Hazard Statements** describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards no matter what the chemical is or who produces it.
5. **Precautionary Statements** describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling. There are four types of precautionary statements: prevention (to minimize exposure); response (in case of accidental spillage or exposure emergency response, and first-aid); storage; and disposal. For example, a chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: "Do not breathe dust/fume/gas/mist/vapors/spray. Get medical advice/attention if you feel unwell. Dispose of contents/container in accordance with local/regional/national and international regulations."
6. **Pictograms** are graphic symbols used to communicate specific information about the hazards of a chemical. On hazardous chemicals being shipped or transported from a manufacturer, importer or distributor, the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label.

*Note:* It is important to read the label each time you use a newly purchased chemical. It is possible the manufacturer may have added new hazard information

or reformulated the product since your last purchase, and thus altered the potential hazards you face while working with the product.

**SAMPLES OF LABELS**

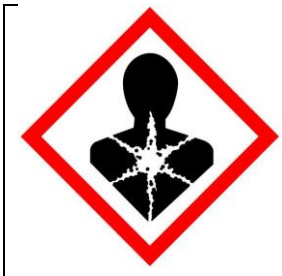
CORRECT

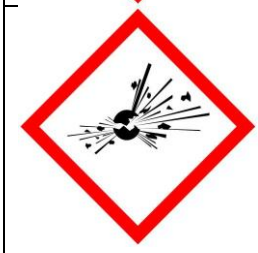
INCORRECT

**Activity 5: Recognizing the Pictograms**

In this activity, participants will watch a video depicting a cartoon character 'Napo" involved in some work activities that put him in danger when using chemicals. The video can be found at http://www.napofilm.net/en/napos-films/napoepisode?filmid=napo-012-danger-chemicals.

After watching the video, participants will be asked to pick one card from a pile. Each card corresponds to a pictogram, the name of the pictogram and the hazards. They will then have to look for the other participants that have the components that correspond to each other. For example the person with the card that says "health hazard" will have to look for the person that has the pictogram of the health hazard and also for the person that has the actual hazards. Once the participants with the matching cards have found each other, they will have to talk to each other about the symbol they have and what is its potential for danger. They will have to come up with an example of a chemical product they have seen this symbol on or if they have experienced an accident produced by that particular hazard. This activity will help review what they saw on the video, as well as a discussion.

| | | |
|---|---|---|
|  | **Health Hazard** | • Carcinogen<br>• Mutagenicity<br>• Reproductive toxicity<br>• Respiratory sensitizer<br>• Target organ toxicity<br>• Aspiration toxicity |

| | | |
|---|---|---|
|  | **Flame** | • Flammables<br>• Pyrophorics<br>• Self-Heating<br>• Emits Flammable Gas<br>• Self-Reactives<br>• Organic Peroxides |
|  | **Exclamation Mark** | • **I**rritant (skin and eye)<br>• Skin Sensitizer<br>• Acute Toxicity (harmful)<br>• Narcotic Effects<br>• Respiratory Tract Irritant<br>• Hazardous to Ozone Layer (Non-Mandatory) |
|  | **Gas Cylinder** | • Gases Under Pressure |
|  | **Corrosion** | • Skin Corrosion/ Burns<br>• Eye Damage<br>• Corrosive to Metals |
|  | **Exploding Bomb** | • Explosives<br>• Self-Reactives<br>• Organic Peroxides |
|  | **Flame Over Circle** | • Oxidizers |

| | | |
|---|---|---|
|  | **Environment (Non-Mandatory)** | • Aquatic Toxicity |
|  | **Skull and Crossbones** | • Acute Toxicity (fatal or toxic) |

**Activity 6: Understanding Safety When handling Chemicals (2 hours)**

In this activity we will teach participants how to read the NFPA Chemical Hazard Label. We will go over what each color and symbol represents. We will follow by giving them samples of labels found in products that are commonly used in different jobs day laborers perform; for example glass cleaner, thinner, crack sealant, paint, wood stain, etc. Participants will have to fill out a blank NFPA Chemical Hazard label with information about a chemical we will provide.

You may have noticed a diamond shaped label with 4 different colors and numbers in some chemical products. The label may look simple, but it actually carries a lot of information and it may help you identify the hazards associated with that product. This label is color-coded and each color represents a different type of hazard. Also, as mentioned before, it also uses a number system and each number represents the degree of a particular hazard.

**NFPA Rating Explanation Guide**

| RATING NUMBER | HEALTH HAZARD | FLAMMABILITY HAZARD | INSTABILITY HAZARD |
|---|---|---|---|
| 4 | Can be lethal | Will vaporize and readily burn at normal temperatures | May explode at normal temperatures and pressures |
| 3 | Can cause serious or permanent injury | Can be ignited under almost all ambient temperatures | May explode at high temperature or shock |
| 2 | Can cause temporary incapacitiation or residual injury | Must be heated or high ambient temperature to burn | Violent chemical change at high temperatures or pressures |
| 1 | Can cause significant irritation | Must be preheated before ignition can occur | Normally stable. High temperatures make unstable |
| 0 | No hazard | Will not burn | Stable |

| RATING SYMBOL | SPECIAL HAZARD |
|---|---|
| ALK | Alkaline |
| ACID | Acidic |
| COR | Corrosive |
| OX | Oxidizing |
| | Radioactive |
| W | Reacts violently or explosively with water |
| W OX | Reacts violently or explosively with water and oxidizing |

**Special Notice Key (White)-** This table contains special indications for some products. For example, if it is an oxidizing product, corrosive, water reactive or radioactive.

Example:


Note: Regardless of the numbers on the label - even if they carry ones or zeros - be cautious. All chemicals should be treated with the utmost of care.

**Safety Data Sheets – SDS**
The Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) to communicate the hazards of hazardous chemical products. SDSs must be in a uniform format, and include the properties of each chemical; the physical, health, and environmental health hazards; protective measures; PPE; stability and reactivity; and safety precautions for handling, storing, and transporting the chemical.

**Activity 7: Types of Paint and Chemicals Used in Painting**
Let's explore the basic types of paint and chemical products used in painting and the dangers they pose:

**Water Based Paint:** Health risks are low, but could affect people who are very sensitive to smells or people allergic to vapors from paint. These products do not pose immediate fire risk. If you get paint on you, wash your hands and any part of your body exposed to the paint with water and soap (do not use detergent).

**Oil Based Paint:** Oil paint is a type of slow-drying paint that consists of particles of pigment suspended in a drying oil, commonly linseed oil. Oil-based paint contains potentially poisonous hydrocarbons, and high levels of volatile organic compounds,

or VOCs, which perform numerous functions in paint and evaporate as the paint dries. The most significant health effects of oil-based paint are due to polluted air from VOCs, inhalation and poisoning. These products can catch fire if they are exposed to excessive temperatures or high temperatures for a long time.

**Paint Remover:** is a product designed to remove paint and other finishes and also to clean the underlying surface. Two basic categories of chemical paint removers are caustic and solvent. The active ingredients inmost common paint removers are organic solvents, which may damage the skin, eyes, respiratory tract, nervous system, and internal organs. Special precautions must be taken in their use. The fire-causing potential of solvents can be classified as "extremely flammable," "flammable," combustible," or "non-flammable."

**Paint Thinner:** paint thinner is a solvent used to thin oil-based paints or clean up after their use. It contains chemicals that are hazardous to human health. They can cause headaches, nausea, depression if inhaled, confusion, and respiratory distress. It can irritate the skin, eyes, nose and throat when inhaled and also has anesthetic qualities. Many of these elements are also highly flammable.

**Activity 8: Other Hazards to Look Out for when Painting**
Making reference to the answers participants gave during activity 2, review the following hazards with participants. After, divide participants in 5 groups and assign one hazard to each group. Participants have to come up with a basic preventative plan so that workers are not exposed to the particular hazard they were assigned in their group. Presentations will follow.

**Exposure to silica:** Silica is widely used in concrete and masonry products, such as the fillers and stuccos**.** When the product is sanded, grinded, or mixed, the dust containing silica may become airborne. When silica particles are inhaled, especially the crystalline silica, it can become trapped in the lung tissue. The lung tissue then reacts by developing fibrous tissue around the trapped silica particles. This condition, which is known as silicosis, is a chronic condition that takes many years to develop.
Prevention:

**Exposure to lead:** Lead exposure occurs when lead laden dust and fumes are inhaled while painting with lead-based paint, grinding/sanding old lead-based paint, or hot work on metals containing lead. Lead can also enter the body when it is accidentally ingested from contaminated hands, food, water, cigarettes and clothing. Lead is released into the blood and distributed throughout the body. Most of it accumulates in the bones where it can be stored and then released into the blood decades later, causing exposure to organs.

**Falls:** Falling from high places, such as ladders, scaffolds, elevated platforms are common accidents when painting. The causes for falls can be several, but among the

most common are slips, trips, cluttered working spaces and using unstable ladders and scaffolds.

**Electrical Hazards:** Electric shocks, depending on certain conditions, can be fatal, even at relatively low voltages. The amount of time that an electrical current lasts has a great influence in the severity of the injuries. If the electric current has a short duration, then it may just cause pain. If the electric shock is longer, then it can be fatal, even if the voltage is not very high. It is important to note that workers and all tools need to be at least 10 feet away from energized power lines.

**Musculoskeletal Disorders:** When we load, lift, push, drag, or hold something we are using too much strength and therefore putting a lot of strain on our muscle tissues and ligaments. Another common injury for painters is caused by the frequent and repeated manipulation of their tools (brushes, rollers, sprayers, etc.), even if you don't need to use much strength. The damage is caused by the excessive effort to which the parts and fibers of the muscle undergo during long periods of time.

~~After reviewing each of the hazards, have an open discussion with participants about how to avoid the dangers posed by the hazards and what would be some ways of accident and illness prevention~~.

**Activity 9: How can I protect myself from hazardous chemicals?**

Let participants know that it is very important for them to be well informed of the chemical products they have to use when working as painters and to know what to do in case they are overexposed to chemical hazards. Since day laborers often do not have the proper training, it is important for them to be aware of a few things they can do that can potentially protect them and their co-workers:

**The Right to Know-** everyone who works with toxic substances should know the names, toxicity, and other hazards of the substances they use. Employers are required by law to provide this information, along with training in how to use toxic substances safely.

**Permissible Exposure Limits (PELs)-** It is important to understand how long we can be exposed to a chemical. Health and safety authorities establish the exposure limits of hazardous substances. OSHA PELs are based on an 8-hour time weighted average (TWA) exposure. An employer can be cited and fined if employees are exposed over the PEL.

Exposure limits usually represent the maximum amount (concentration) of a chemical, which can be present in the air without presenting a health hazard. However, exposure limits may not always be completely protective, for the following reasons:

- Information for chronic health effects is not complete because it may take many years for an illness to appear.
- Workers can be affected by chemical exposure at different levels depending on their own physical state and how much strength is needed to perform their job.
- Chemical interactions are not taken into account. How many different chemical products are being used?
- Limiting the chemical concentration in air may not prevent excessive exposure through skin contact or ingestion.

**Ventilation-** Ventilation is one of the most effective methods for controlling solvent vapors and dusts generated by paint activities by either supplying or exhausting air. Always make sure there is circulation of fresh air sufficient to keep concentrations of toxic substances diluted below hazardous levels. There are two main types of ventilation methods: general ventilation (or dilution ventilation) and local exhaust ventilation.

*General ventilation* is used to describe a ventilation system that supplies and exhausts large volumes of air from work areas. This method is effective when you want to dilute low concentrations of vapor or dust from painting activities to acceptable levels. Examples of general ventilation systems are the use of natural drafts through open windows and doors, roof ventilators, or mechanical fans or blowers mounted in roofs, walls or windows.

*Local exhaust ventilation* refers to a ventilation method that contains or "captures" contaminants at their source of generation before they escape into the work environment and to the worker. A typical local exhaust ventilation system consists of a hood (captures the contaminant), ducts (transports the contaminant away from the work area), an air cleaner if required (cleans the contaminants from the air) and a fan (moves the air with the contaminant away from the work area to outside). Paint spray booths and dust collection systems are good examples of local exhaust ventilation.

**Substitution-** The use of a less hazardous substance. But before choosing a substitute, thoroughly consider its physical and health hazards. Also consider environmental aspects such as air pollution and waste disposal.

**Work practices and behaviors-** workers can control dust dispersion by spraying water (or dust suppressant products), closing containers of volatile chemicals when not in use, and labeling containers of hazardous substances.

**Use of PPE-** workers should wear Personal Protective Equipment when handling chemicals:

Respiratory protective equipment consists of devices that cover the mouth and nose to prevent substances in the air from being inhaled. A respirator is effective only when used as part of a comprehensive program established by the employer, which includes measurement of concentrations of hazardous substances, selection of the proper respirator, training the worker in its proper use, fitting of the respirator to the worker, maintenance, and replacement of parts when necessary. A health care professional must first determine whether the individual worker can wear a respirator safely.

Protective clothing includes gloves, aprons, goggles, boots, face shields, and any other materials worn as protection. It should be made of material designed to resist penetration by the particular chemical being used. Such material may be called impervious to that chemical. However, most materials do not remain impervious for very long. The manufacturer of the protective clothing usually can provide some information regarding the substances that are effectively blocked and how often replacement is necessary.

**Prevention Table:**
Review the table with the participants.

| **WAY OF ENTRY/RISK** | **PREVENTION METHOD** |
|---|---|
| RESPIRATORY ROUTE: INHALATION OF THE PRODUCT<br>Irritation of the airway and intoxication in the case of exposure to very strong products. | 1. Handle products in well-ventilated areas.<br>2. Avoid for products to become pulverized.<br>3. Use PPE (the proper equipment according to the product manufacturer). |
| SPLASHING THAT CAN AFFECT THE EYES AND THE FACE<br>The eyes and the face can be severely damaged, especially by corrosive products. | 1. Handle the products with care, avoiding splashing (not shaking the container or any brushes, sticks or rags that may have been used).<br>2. Don't rub your eyes after handling the chemical product.<br>3. Use the proper PPE (goggles, face shileds, etc.) |
| PRODUCT PENETRATION THROUGH THE SKIN<br>Irritation, burns and allergies can develop from exposure to the chemical product. | 1. Always wash your hands after using a chemical product.<br>2. If you have an open wound, cover that area thoroughly.<br>3. Use PPE that protects the skin (coveralls, gloves, etc.) |
| INGESTION<br>The consumption of chemical products can be very serious for the health. | 1. Keep the products locked or in a place where only authorized personnel has access.<br>2. Always keep the containers closed. |

| | |
|---|---|
| | 3. Wash your hands and change your clothes before eating or before handling food. |

**Avoiding creating hazards when storing chemicals**

**Storing Flammable Products**
Many of the substances used by painters are flammable; therefore, the following general precautions should be taken when storing these products:

- Store products in a cool environment
- Store products away from ignition sources
- Do not store incompatible products side by side
- Mark storage locations with signs/warnings
- Have easy access to fire extinguishers
- Fire extinguishers should be appropriate for the products being stored (see
- MSDS)
- Stored products should not block isles or exits

Thinners and solvents are flammable products with low flash points. Therefore, they should be stored in cool environments away from ignition sources. Dry chemical, carbon dioxide, foam and water fog are appropriate extinguishing media for most thinners and solvents.

**Products that Release Vapor**
The products used by painters may also release vapors into the air. Therefore, the following precautions should be taken to ensure that the release of these vapors are minimized and do not accumulate while the products are in storage:

- Keep product containers tightly closed when not in use.
- Keep product containers upright.
- Prevent product containers from being damaged (i.e. piercing).
- When transferring products to new containers, make sure the container material is compatible with the product and clearly labeled.
- Keep product containers in a well-ventilated area.
- Keep product containers in a dry location.

Thinners and solvents contained in paint have high volatility and easily release vapors into the air. Therefore, when these products are not is use, the containers should be tightly sealed, kept upright and free of punctures.

**What if I have been exposed?**
If you or your co-workers experience symptoms known to be caused by a chemical during or shortly after its use, you may have been overexposed. Symptoms might

include irritation and tearing of the eyes, a burning sensation of skin, nose, or throat, and cough, dizziness, or headache.

**Here are some things you can do in case of overexposure to chemical hazards: Stop what you are doing and leave the space contaminated. Alert your supervisor. Call 911 for emergencies or the Poison Control Center 1-800-222-1222.**

**In case inhalation:** clean air, rest in a semi recumbent position, artificial respiration if needed and medical care.

**In case of a spill:** take off contaminated clothing, wash area with plenty of water, seek medical care.

**In case of splashing:** Rinse with plenty of water for several minutes and seek medical care.

**In case of consumption:** rinse the mouth, DO NOT induce vomiting, drink plenty of water, and seek medical care.

**Activity 10: Post Test**
Repeat the icebreaker activity as the post-test.

*Some content of this training was adapted from the publication "An Introduction to Chemical Hazards in the Workplace" by the State of California Department of Public Health and Department of Industrial Relations, IATSE Local 891 "Paint Department Health and Safety Guidelines". The video "Napo in… Danger: Chemicals!" can be found at www.napofil.net. "The Napo films or individual scenes from the films may be used freely for education, training and awareness raising without seeking prior permission from the Napo Consortium."*

# PRE/POST QUESTIONS: CHEMICALS AND OTHER HAZARDS IN PAINTING

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## Questions:

1. Name the types of hazards.

2. What are some hazards to which workers are exposed to when painting?

3. Chemicals come in different physical forms, such as liquids and vapors, what other physical forms of chemical are there?

4. How can chemicals enter your body?

5. True or False: OSHA requires labels on chemical products to have name, address and telephone Number of the chemical manufacturer; a product identifier; signal words; hazards and precautionary statements; and pictograms.

6. Explain what information is contained is a NFPA Chemical Hazard Label.

7. How should chemicals used in painting be stored safely?

8. How can workers protect themselves from hazardous chemicals when painting?

**Answers:**

1. Safety hazards, physical hazards, chemical hazards, biological hazards, ergonomic hazards, and work organization hazards.

2. Exposure to hazardous chemicals, working at heights, ergonomic hazards, electrical hazards.

3. The main physical forms of chemicals are solids, dusts, liquids, vapors and gases.

4. Respiratory route (through the nose and the mouth, the lungs, etc.), digestive route (through the mouth, stomach, intestines, etc.), parenteral route (through open wounds, sores, etc.), dermal (through the skin).

5. TRUE

6. The NFPA Chemical Hazard Label is color-coded and each color represents a different type of hazard: the red section denotes flammability, the blue signifies health considerations, the yellow designates reactivity, and the white gives other special precautions. Each section of the diamond contains a number from 0 (minimal hazard) to 4 (severe hazard) that indicates the relative degree of risk presented by the material.

7. Answers: Storing products in a cool environment, storing products away from ignition sources, not storing incompatible products side by side, marking storage locations with signs/warnings, having easy access to fire extinguishers, storing products in a way that does not block isles or exits, keeping product containers tightly closed when not in use, keeping product containers upright, preventing product containers from being damaged (i.e. piercing), making sure to label products properly and putting them in appropriate containers when transferring products to new containers, keeping product containers in a well-ventilated area, keeping product containers in a dry location.

8. By knowing their rights ("the right to know", PELs, etc.), being informed of the chemicals they are using, having ventilation, substituting hazardous chemicals with less hazardous ones, adapting safe work practices and behaviors, using PPE, storing chemicals products safely.

**Level 1 Evaluation:** Chemicals and Other Hazards in Painting

**Facilitator:_____ Location:_____**
**Date:_____ Time: _____**

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**What did you like about the training?**

**What did you like the least about the training?**

**What are the top 3 things you learned during the training that will be useful for you?**

- 
- 
- 

**Was there any information you felt was missing from the training?**

**Please provide some suggestions to improve this training:**

**How would you rate this training?**

| Excellent | Good | Regular | Bad | Awful |
|---|---|---|---|---|
| ❍ | ❍ | ❍ | ❍ | ❍ |