

IRRITANTS

Definition

Irritants are chemicals that can cause a reversible inflammation of your nasal passages, tear ducts, or skin. Chemicals that are classified as irritants would usually be classified as corrosives, if they were in a more concentrated form. In other words, irritants are usually diluted corrosives.

Examples

Ammonia, degreasers, nitrogen dioxide, hydrogen chloride, and many **solvents**.

Exposure Symptoms

Because irritants inflame your mucous membranes, exposure would typically result in an itchy, runny nose and itchy, watery eyes. These minor sensations can intensify to a stronger, burning sensation, if the degree of exposure is high enough. In addition, dermal exposure to an irritant can result in itchy, scaling, and/or blistered patches of skin.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and personal protection equipment (PPE). For irritants, PPE typically includes gloves and goggles.

Avoid skin contact with irritants by wearing the proper work clothes (long sleeve shirt, pants, closed shoes/boots).

Wash your hands frequently and shower after work if possible.

Change your work clothes daily to avoid recontamination.

Wash your work clothes separate from your other laundry.

Use known irritants in well-ventilated areas.

Emergency Protocol

If you are working with an irritant and experience any of the symptoms of exposure you should stop work immediately and evaluate your **engineering controls** and PPE. You should also know the location of the nearest sink, eye wash station and/or emergency shower so that you can act quickly, if an accident should occur and your symptoms are extreme. Immediately flushing the affected area with water will often eliminate the symptoms. However, if symptoms persist seek medical attention as soon as possible.

SENSITIZERS

Definition

Sensitizers affect certain individuals by causing an allergic reaction after repeated exposure. These same substances will have no adverse reaction in others. It is important to note that a chemical is only considered a sensitizer, if it causes a reaction in a *substantial* proportion of exposed people.

Examples

The most recognized sensitizers are the oils of certain “poisonous” plants such as poison ivy, oak, and sumac. Chlorinated hydrocarbons, formaldehyde, and chromium compounds are sensitizers that may be present in the workplace.

Exposure Symptoms

Breaking out in a skin rash, referred to as allergic dermatitis, is the most common response to sensitizers. The rash may resemble hive-like blisters or may cause patches of itchy and/or scaling skin.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and personal protection equipment (PPE). For sensitizers, PPE typically includes gloves, barrier creams, protective clothing, and eye protection.

Be very careful to avoid skin contact with sensitizers by wearing the proper work clothes (long sleeve shirt, pants, closed shoes/boots).

Wash your hands frequently and shower after work if possible.

Change your work clothes daily to avoid recontamination.

Wash your work clothes separate from your other laundry.

Use sensitizers in well-ventilated areas.

Emergency Protocol

Since the reaction from a sensitizer is not immediate, the best protection is good work practices. However, if you develop any kind of skin reaction, you should always consult a physician. A doctor will be able to help you determine if your reaction may be due to something in the workplace.

CORROSIVES

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Definition

Corrosives are harsh substances that cause visible destruction of skin and eyes on contact and internal organs, if you swallow or inhale them. The term corrosive does not refer to destruction of inanimate surfaces. Corrosives are usually concentrated forms of irritants.

Examples

Laundry detergent, floor stripper, graffiti remover, rust remover, acids (such as sulfuric acid), and bases (such as caustic soda).

Exposure Symptoms

Eyes: If a corrosive mist or other small amount gets in your eyes, symptoms can include burning, watering, irritation, or inflammation. If a corrosive splashes in your eyes, the results can include cloudy vision and may cause permanent scarring.

Skin: If a small amount or a low concentration of a corrosive gets on your skin, you may develop irritated, itchy, or sore skin. If your skin is splashed directly by a corrosive, it can burn your skin, causing blisters or even penetrate through the skin itself.

Inhaled and Swallowed: If you breathe in a small amount of corrosive mist, symptoms can include nose, mouth, and throat irritation. If you breathe in a more highly concentrated or a greater quantity of corrosive mist, you may have a heavy sensation in your chest and a hacking cough (a sign of inflamed lung membranes or bronchitis). You may also have chest pain and difficulty breathing. If you swallow even a small amount of a corrosive, you may experience severe abdominal pain.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and personal protection equipment (PPE). For corrosives, PPE typically includes corrosive-resistant gloves, eye protection, and a face mask.

Avoid skin contact with corrosives by wearing the proper work clothes (long sleeve shirt, pants, closed shoes/boots).

Store corrosives in accordance with the manufacturer's recommendations.

Use corrosives only in well ventilated areas.

CORROSIVES

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Emergency Protocol

For most medical emergencies involving corrosives, the first treatment will be water for skin and eyes or fresh air for inhalation. But since corrosives are so harsh, immediate treatment by medical professionals is always critical.

Eyes: If a corrosive gets in your eyes, go directly to the nearest eyewash station. If none is nearby, use any low-pressure clean water source. Remove contact lenses which can absorb or trap the corrosive. Flush your eyes for 15-20 minutes, letting the water run from the inside to the outside of the eyes. Do not apply neutralizers or ointments, which can make potential damage worse. Immediately after flushing, get to a medical professional for further treatment.

Skin: If you get a corrosive on your skin, rinse (don't scrub) the affected area for 15-20 minutes. If you are not near a safety shower, use a faucet, hose, or any clean water source. Remove any contaminated clothing and do not put it back on until it has been cleaned. Do not apply burn ointments or neutralizing solutions. If possible, after rinsing, cover the burn with a sterile dressing and then immediately get to a medical professional for further treatment.

Inhaled: If you inhale corrosive vapors and are experiencing symptoms of exposure, get to fresh air immediately and ask a coworker to get medical assistance immediately.

Swallowed: If you swallow a corrosive, ask a coworker to get medical assistance immediately and to call the local Poison Control Center. Don't eat or drink anything unless it says to on the label or **MSDS** or if a medical professional gives you such direction.

CARCINOGENS

Definition

Carcinogens can affect your health by causing an abnormal multiplication of cells that tend to infiltrate other tissues and spread (or metastasize). Cancer is a chronic health effect that can take many years to develop. Chemicals are classified as carcinogens if they have been: evaluated by the International Agency for Research on Cancer and found to be a carcinogen or potential carcinogen; listed as a carcinogen or potential carcinogen in the *Annual Report on Carcinogens*; or regulated by OSHA as a carcinogen.

Examples

Asbestos and benzene.

Exposure Symptoms

There are no immediate symptoms from exposure to a carcinogen unless that chemical also has a more immediate health effect (for example, if it is also a corrosive).

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and personal protection equipment (PPE).

Because the effects of carcinogens are typically chronic and there isn't always an immediate reaction, it is sometimes easy to overlook safety precautions and PPE requirements. You should always remember that although potential harmful effects won't occur until the future, they are usually serious enough to warrant your attention in the present!

Because early diagnosis can be critical in successfully treating cancer, you should be diligent with regular physical examinations and you should always inform your physician of any potential occupational exposure to hazardous chemicals (carcinogens or otherwise).

Emergency Protocol

Follow emergency guidance for any immediate health effects caused by the chemical, if any, and report the exposure to your supervisor and physician for follow-up.

SYSTEMIC POISONS

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Definition

Systemic poisons cause an adverse health effect to a specific target organ. In fact, you may hear them referred to as target organ chemicals. Systemic poisons can enter the body via the typical exposure pathways (inhalation, skin and eye contact, and/or ingestion), but once they're in the bloodstream they travel to a specific internal organ and can compromise the health of that organ and, subsequently, the overall health of an individual.

Examples

Mercury, lead, organic solvents, acids, and asbestos (see the table below for more details).

Exposure Symptoms

Like carcinogens, most of the effects of systemic poisons are chronic and do not become immediately apparent. Although with some of the systemic poisons that affect the skin, eyes, or lungs, there may be some relatively immediate symptoms.

The following table shows the different types of systemic poisons and provides general exposure symptoms and examples for each:

HAZARD	TARGET ORGAN EFFECT	SIGNS AND SYMPTOMS	EXAMPLE HAZARDOUS CHEMICAL
Hepatotoxins	Liver Damage	Jaundice; Liver Enlargement	Carbon Tetrachloride
Nephrotoxins	Kidney Damage	Edema; Proteinuria	Halogenated Hydrocarbons
Neurotoxins	Nervous System	Narcosis; Behavioral Changes; Loss of Motor Function	Mercury; Carbon Disulfide
Hematopoietic (Blood)	Decrease Hemoglobin Function	Loss of Consciousness	Carbon Monoxide; Cyanides
Reproductive Toxins	Reproductive Ability; Effects on Fetuses	Birth Defects; Sterility	Lead
Cutaneous Hazards	Dermal Layer	Defatting of the Skin; Rashes; Irritation	Chlorinated Compounds
Eye Hazards	Eye or Visual Capacity	Conjunctivitis; Corneal Damage	Organic Solvents; Acids
Lung Hazards	Pulmonary Tissue	Cough; Tightness in Chest; Shortness of Breath	Silica; Asbestos

SYSTEMIC POISONS

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Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and personal protection equipment (PPE).

Because the effects of systemic poisons are typically chronic and there isn't usually an immediate reaction, it is sometimes easy to overlook safety precautions and PPE requirements. You should always remember that although potential harmful effects won't occur until the future, they are usually serious enough to warrant your attention in the present!

Because early diagnosis can be critical in successfully treating damage from systemic poisons, you should be diligent with regular physical examinations and you should always inform your physician of any potential occupational exposure to hazardous chemicals (systemic poisons or otherwise).

Emergency Protocol

Follow emergency guidance for any immediate health effects caused by the chemical, if any, and report the exposure to your supervisor and physician for follow-up.

FLAMMABLES

Definition

A chemical in a solid, liquid or gas state that has a **flashpoint** below 100°F.

Since flammables burn at close to room temperature, when they are near a spark, flame, or even static electricity, safe procedures must always be followed.

Examples

Spray paint, naphtha, acetone, alcohol, propane, phosphorous and many powdered metals.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and specific personal protection equipment.

Use in well ventilated areas with no heat or ignition sources available.

Use non-sparking tools when working with or near flammables.

Bond and ground containers before transferring liquids from one container to another to prevent dangerous static electricity.

Store in **flammable liquid storage cabinets** and make sure all containers are labeled.

Store away from oxidizers, peroxides and water-reactives.

Know the location of the right kind of fire extinguisher for the chemical you're using.

Emergency Protocol

In an emergency, your quick response may prevent damage. You should handle an emergency yourself, only if it is small and you are trained to do so. Turn off any flames and equipment that can spark. Open windows and ventilate the area thoroughly. Clean up any spills using safe procedures and materials.

If there is a fire, make sure to use the right kind of extinguisher (but only if you've been trained to do so).

COMBUSTIBLE LIQUIDS

Definition

A chemical in a liquid state that has a **flashpoint** at or above 100°F but below 200°F.

Although they don't burn quite as readily as flammables, combustible liquids are prevalent in almost any work setting, so they can pose as much of a fire threat due to their sheer quantity in the workplace.

Examples

All organic chemicals are combustible.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and specific personal protection equipment.

Use in well ventilated areas with no heat or ignition sources available.

Use non-sparking tools when working with or near combustibles.

Bond and ground containers before transferring liquids from one container to another to prevent dangerous static electricity.

As a precaution, store combustible liquids in **flammable liquid storage cabinets** and make sure all containers are labeled.

Store combustible liquids away from oxidizers.

Know the location of the right kind of fire extinguisher for the chemical you're using.

Emergency Protocol

In an emergency, your quick response may prevent damage. You should handle an emergency yourself, only if it is small and you are trained to do so. Turn off any flames and equipment that can spark. Open windows and ventilate the area thoroughly. Clean up any spills using safe procedures and materials.

If there is a fire, make sure to use the right kind of extinguisher (but only if you've been trained to do so).

COMPRESSED GASES

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Definition

Compressed gases are stored in cylinders under significant pressure. You can identify the hazards associated with the specific gas being stored (for example, flammable or reactive) by referring to the labels on the cylinder and the **MSDS**. Regardless of the properties of gas inside the cylinder, any gas under pressure poses an inherent physical hazard, because it can explode if the cylinder is improperly stored or handled. In addition, improperly releasing the gas from a cylinder is extremely dangerous. A sudden release of gas can cause a cylinder to behave like a missile-like projectile, possibly resulting in significant damage and injury.

Examples

Nitrogen, hydrogen, acetylene, and oxygen.

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions and specific personal protection equipment associated with the gas being stored in the compressed gas cylinder.

Storage (general): Store cylinders in a secure area specifically designated for that purpose. The cylinders should be chained and racked in an upright position and the construction of the storage area should protect the cylinders from being struck by any other object. The area must be well ventilated and away from sources of heat (including direct sunlight), combustible materials (by at least 20 feet), and flammable gases (by at least 20 feet). The cylinders should also be protected from ice and snow accumulation and from contacting electrical equipment or grounding cables.

Storage (compatibility): Oxygen cylinders, full or empty, should not be stored in the same vicinity as flammable gases such as hydrogen or acetylene. Also, never store greasy and oily materials near compressed gas cylinders and never use oil or grease on the cylinder fittings.

COMPRESSED GASES

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Safe Work Practices (continued)

Use: Only use a compressed gas cylinder if you have been specifically trained to do so and then always be sure to follow standard operating procedures and manufacturers' recommendations during use. Also, remember to always inspect cylinders before use (including the valves, gas lines, regulators, piping, connections, etc.) and to close the cylinder valves when your work is finished.

Maintenance: Check all cylinders periodically for corrosion, general distortion, cracks or any other defects indicating a weakness or making the cylinder unfit for use. Remember to check the bottom of the cylinders as well. Always be aware of any odors or hissing sounds near cylinder storage areas and immediately report any findings to your supervisor.

Transport: You should only move a compressed gas cylinder if you are specifically trained to do so (even if it's only for a short distance). If you are trained, then remember to protect valves during transportation and never roll or drag a cylinder. Also, only move one cylinder at a time and if it's a large cylinder then it should be strapped to a properly designed wheeled cart to ensure stability.

Emergency Protocol

If a leaking cylinder is discovered, do not attempt to move it to a secure place unless it is safe to do so and you have received the proper training on transporting compressed gas cylinders. If the cylinder cannot be moved, make sure that all affected personnel are told to leave the area of concern immediately. You should also advise your supervisor immediately, so the vendor can be called (along with any other appropriate safety professionals). Under no circumstances should any attempt be made to repair a cylinder or valve.

REACTIVES

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Definition

Reactives are dangerous chemicals that can explode or burn under conditions that are safe for most substances. Because of their inherent instability, they are sometimes referred to as “nervous” chemicals.

An EXPLOSIVE is a specific type of reactive that causes a sudden, almost instantaneous release of pressure, gas and heat when subjected to sudden shock, pressure or high temperature.

An OXIDIZER is a specific type of reactive that contains a large percentage of oxygen. They can cause other substances, like flammables, to burn more readily.

Examples

Some examples of EXPLOSIVES are: picric acid, antimony metal or powder, grain dust, black powder, nitroglycerin, and TNT.

The most common example of an OXIDIZER is chlorine (i.e., household bleach).

Safe Work Practices

Always refer to the **MSDS** for specific manufacturer recommended safety precautions, storage requirements, and specific personal protection equipment.

Never move, mix, or work with a reactive unless you know what causes it to react.

Use reactives in well-ventilated areas with no heat or ignition sources available. Also, keep all reactives away from flammables (Note that oxidizers should be kept away from both flammables and combustibles).

Oxidizers should be separated from incompatible chemicals such as acids and peroxides.

DO NOT work with explosives unless you have specific training.

Know the location of the right kind of fire extinguisher for the chemical you're using.

REACTIVES
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**Safe Work
Practices
(continued)**

Check the expiration date on all containers of reactive chemicals. Any chemical that has past its expiration date should be disposed of as hazardous waste.

**Emergency
Protocol**

In an emergency, your quick response may prevent damage. You should handle an emergency yourself, only if have been trained to do so (otherwise you might make the situation worse). If you haven't been trained and there is an emergency involving a reactive chemical, leave the area quickly and tell other personnel in the area to do the same. If you are *sure* that danger is not imminent, you can open any windows before leaving. Close all doors as you exit and immediately find a supervisor or someone trained to handle the situation. Turn off any flames and equipment that can spark if you can do so from outside the area.

Victims of reactive emergencies can be seriously hurt. If someone has been injured, request medical assistance immediately. It may be necessary to bring the victim to an eyewash station, safety shower, or fresh air source. Do so, only if failure to move the victim will result in additional injury or harm.