

How to Work Safely with

How to Work Safely with - Hazardous Products Using the "Flame" Pictogram

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What does this pictogram mean?

The symbol within the pictogram is a flame with a line underneath it. This symbol indicates that hazardous products with this pictogram can ignite easily and burn rapidly if they are not stored and handled properly.



Which hazard classes use the flame pictogram?

In most workplaces, you will see this pictogram used on hazardous products for the following WHMIS hazard classes:

- Flammable gases – Categories 1A and 1B
- Flammable gases - Category 1A, Pyrophoric gas
- Flammable gases - Category 1A, Chemically unstable gas A and B
- Aerosols – Categories 1 and 2
- Flammable liquids – Categories 1, 2, and 3
- Flammable solids – Categories 1 and 2

There are other hazard classes that use the flame pictogram but products with these hazards are not commonly found in workplaces:

- Self-reactive substances and mixtures - Types B*, C, D, E, and F
- Pyrophoric liquids – Category 1
- Pyrophoric solids – Category 1
- Self-heating substances and mixtures – Categories 1 and 2
- Substances and mixtures which, in contact with water, emit flammable gases – Categories 1, 2 and 3
- Organic peroxides – Types B*, C, D, E and F

*Note that the most severe hazard category in the organic peroxides and the self-reactive substances and mixtures hazard classes (Type A) are assigned the exploding bomb pictogram. Type B is assigned two pictograms – the flame and the exploding bomb.

What are the hazards of products that have a flame pictogram?

Hazardous products with the flame pictogram can be a fire or explosion hazard in the workplace.

For a fire to occur, three elements must be together at the same time and in the right proportions:

- a source of fuel (e.g., the flammable product),
- oxygen, and
- heat (e.g., an ignition source such as a spark).

It is very important when working with flammable products that these three elements are not present together in the right amounts at any time.

The following hazards are also associated with flammable liquids:

- **Accumulation of static charge** – [static electricity](#) is the electric charge generated when there is friction between two things made of different materials or substances. This charge can occur and accumulate when flammable liquids are poured, pumped, filtered, agitated, stirred or flow through pipes, and these actions can act as an ignition source. Release of the static charge from the liquid can ignite flammable products.
- **Flashback** – the vapour of most flammable liquids is heavier than air. In this case, the vapour can spread a long distance along the ground or floor and eventually be ignited by a distant spark, flame or other source of heat. Once the vapour ignites, the flames or fire can “flash-back”, meaning that the flames travel back to the container or source of the flammable liquid and an explosion can occur.

You also need to consider the potential for **hazardous thermal decomposition and combustion products**. When flammable products burn, hazardous gases and vapours can be produced (e.g., carbon monoxide, hydrogen cyanide and nitrogen oxides).

What signal words and hazard statements are used?

The WHMIS signal words and hazard statements for flammable gases, liquids and solids, and aerosols are:

Hazard Class and Category	Signal Word	Hazard Statement
Flammable gases – Category 1A	Danger	Extremely flammable gas
Flammable gas - Category 1B	Danger	Flammable gas
Flammable gases - Category 1A - Chemically unstable gas	Danger	Extremely flammable gas May react explosively even in the absence of air
Flammable gases - Category 1B - Chemically unstable gas	Danger	Extremely flammable gas May react explosively even in the absence of air at elevated pressure and/or temperature
Flammable gases - Category 1A - Pyrophoric gas	Danger	Extremely flammable gas May ignite spontaneously if exposed to air
Aerosols – Category 1	Danger	Extremely flammable aerosol Pressurized container: may burst if heated
Aerosols – Category 2	Warning	Flammable aerosol Pressurized container: may burst if heated
Flammable liquids – Category 1	Danger	Extremely flammable liquid and vapour
Flammable liquids – Category 2	Danger	Highly flammable liquid and vapour
Flammable liquids – Category 3	Warning	Flammable liquid and vapour
Flammable solids – Category 1	Danger	Flammable solid
Flammable solids – Category 2	Warning	Flammable solid

Below are the signal words and hazard statements for the **other** WHMIS hazard classes and categories that are assigned the flame pictogram.

Hazard Class and Category	Signal Word	Hazard Statement
Self-reactive substances and mixtures – Type B*	Danger	Heating may cause a fire or explosion
Self-reactive substances and mixtures – Types C and D	Danger	Heating may cause a fire
Self-reactive substances and mixtures – Types E F	Warning	Heating may cause a fire
Pyrophoric liquids - Category 1	Danger	Catches fire spontaneously if exposed to air
Pyrophoric solids - Category 1	Danger	Catches fire spontaneously if exposed to air
Self-heating substances and mixtures – Category 1	Danger	Self-heating; may catch fire
Self-heating substances and mixtures – Category 2	Warning	Self-heating in large quantities; may catch fire
Substances and mixtures which, in contact with water, emit flammable gases – Category 1	Danger	In contact with water releases flammable gases, which may ignite spontaneously
Substances and mixtures which, in contact with water, emit flammable gases – Category 2	Danger	In contact with water releases flammable gas
Substances and mixtures which, in contact with water, emit flammable gases – Category 3	Warning	In contact with water releases flammable gas
Organic peroxides – Type B*	Danger	Heating may cause a fire or explosion
Organic peroxides – Types C and D	Danger	Heating may cause a fire
Organic peroxides – Types E and F	Warning	Heating may cause a fire

*Recall that these hazard classes and categories are also assigned the explosion pictogram.

Are there other hazards associated with products that use the flame pictogram?

Fire and explosion are the main concerns, but other hazards may be present. Supervisors and workers must understand the specifics of what all of the hazards of the product are and how to use it safely.

Other hazards include:

- **Health hazards** such as acute toxicity, skin corrosion or irritation, carcinogenicity or reproductive toxicity.
- **Other physical hazards** – such as reactivity or corrosive to metals.

How can products with the flame pictogram be handled safely?

- Always check the Safety Data Sheet (SDS) for information about ALL of the hazards and the necessary precautions for the product being used. Ask questions if you are not sure.
- If it is not possible to eliminate the use of the hazardous product in your workplace, evaluate whether it is possible to [substitute](#) it with a less hazardous product.
- Prevent the release of flammable products into the air.
- Use only in [well-ventilated](#) areas. Keep the container tightly closed.
- Use the smallest amount necessary for the job.
- Keep away from heat, hot surfaces, sparks, open flames and other sources of ignition. No smoking.
- Make sure that there is no hot work done in the area, or hidden sources of ignition (e.g., pilot lights in a furnace or hot water tank).
- For aerosols, do not spray on an open flame or other ignition source. Do not pierce or burn, even after use.
- Remove combustible materials (e.g., oily rags, cardboard boxes) from the area where these products are used. Dispose of combustible material appropriately (e.g., oily rags are in approved containers).
- For volatile flammable liquids:
 - Use non-sparking tools
 - Use explosion-proof electrical, ventilating and lighting equipment.
 - Take action to prevent static discharges.
- Sometimes it is necessary to ground and bond container and receiving equipment. Be sure that you understand when and how to do this properly.

- Wear protective [gloves](#), protective clothing, [eye protection and/or face protection](#), as required.
- If [personal protective equipment](#) (PPE) is required, the employer must make sure that workers are thoroughly trained in its selection, fit, use and maintenance. Refer to the SDS for guidance on selection.
- For self-reactives and organic peroxides, keep only in original packaging and keep cool.
- Handle and store pyrophoric products and products that react with water to release a flammable gas under inert gas or a liquid or gas specified by the supplier. Protect from moisture.
- Keep self-heating products cool.
- Avoid contact with incompatible products.
- Be aware of specific conditions to avoid, such as air, water, moisture, temperature, pressure, friction, or sunlight. Check the SDS for specific information and recommendations.
- Avoid spilling the product and contaminating your skin or clothing.
- Do not weld, cut, or perform hot work on an empty container until all traces of the product have been removed.
- Immediately report leaks, spills or failures of safety equipment (e.g., the ventilation system) to your supervisor.
- Keep work areas clean and tidy. Wipe up spills and keep surfaces clean to prevent contact with skin or incompatibles. Prevent accumulation of dust or other residues on ledges or other surfaces.

How can products that use the flame pictogram be stored safely?

- Use equipment designed for flammable storage such as flammable storage fridge, flammable cabinets, or flammable safety cans.
- Avoid storing large quantities if possible.
- Post warning signs.
- Inspect containers and storage area regularly for signs of leakage or damage. Contain spills or leaks by storing the containers in trays made from compatible material.
- Store in a well-ventilated place
- Keep cool.
- Protect aerosols and organic peroxides from sunlight.

- Do not expose aerosols to temperatures exceeding 50 °C (122 °F).
 - Store organic peroxides, self-reactive products and self-heating products within the temperature range recommended by the supplier. Store separately.
 - Maintain an air gap between stacks or pallets of self-heating products.
 - Store products that react with water in a dry place and in closed containers.
 - Keep away from incompatible materials. Check SDS for incompatibles.
 - Ensure that appropriate fire-fighting and spill clean-up equipment is readily available.
 - Avoid storing flammable products in basements. Ground floor storage is preferred because it provides easier access for emergency situations.
 - Follow all applicable health and safety regulations, and fire and building codes.
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What should I do in case of an emergency?

Understand and practice emergency procedures so that you know what to do if it becomes necessary to act:

- Make sure that appropriate fire extinguishers are available.
 - Be aware of at least two different exit paths in the event of fire.
 - Make sure that eyewash and emergency shower are readily available in the immediate work area. These devices must be tested regularly.
 - Have spill control procedures and equipment ready (e.g., absorbent spill control materials, PPE, [non-sparking tools](#), etc.). Avoid using combustible materials (such as paper towels or sawdust) to clean up or absorb spills.
 - Remove contaminated clothing and leather shoes or boots since they can be a severe fire hazard. Wash contaminated items, immediately and thoroughly in water before re-wearing or discarding.
 - Immediately report leaks to your supervisor, warn people in the area, and move to a safe location, if necessary.
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