

FACT SHEET

Explosives Chemical Hazards and Risk Minimization

Before starting any work with hazardous materials, review the SDSs of the specific chemicals

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Explosives

Explosives are chemicals which by themselves are capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Explosives are identified with the Exploding Bomb pictogram.

Section 2 of the Safety Data Sheet (SDS) will contain one or more Hazard Statements describing the nature of the explosive chemical. Examples:

- *Explosive; severe projection hazard*
- *Fire or projection hazard*

**See the "Hazard Statements" fact sheet for more detailed information

Hazard Communication

The "Exploding Bomb" pictogram identifies substances that may be:

- **Explosives** - chemicals which in themselves are capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings
- **Self Reactives** - thermally unstable chemical liable to undergo a strongly exothermic decomposition even without participation of oxygen (air)
- **Organic Peroxides** - contains the bivalent -O-O- structure and may undergo exothermic self-accelerating decomposition

Handling and Storage Precautions

General risk mitigation measures are as follows:

- Review instructions and precautions provided by the manufacturer/distributor with respect to recommended storage and handling instructions.
- Store by hazardous class and in secondary containment. Clearly label storage location and/or secondary containment with hazard class. Refer to SDS for storage condition. Store in flammable cabinet. If to be stored in refrigerator, the refrigerator must be explosion-proof.
- Follow general safe chemical handling practices as outlined in the ECU Chemical Hygiene Plan (CHP).
- Observe all specific safety procedures established in the lab safety plans.
- Wear the appropriate personal protective equipment (PPE) including a closed lab coat, closed toed/heel, nonwoven shoes, eye protection, and compatible gloves.

What do I need to know?

- Follow general safe chemical handling/storage practices as outlined in the ECU CHP and manufacturer SDS
- Substitute for less hazardous chemicals where possible
- Use chemicals on the smallest scale and concentration feasible
- Wear proper PPE when handling explosives
- Before using the explosive chemical, determine what is the initiating mechanism or trigger that could lead to an explosion (i.e. friction, pressure, impact, ...)
- Eliminate source of static discharge
- Know the location of the closest eyewash station and safety shower



Explosives

- Substitute for less hazardous chemicals where possible.
- With explosives, the scale of work is critical and should be done at the smallest scale possible.
- A chemical fume hood (clean, free of clutter), permanent or portable blast shields and remote operations should be used to isolate the researcher from the chemical as much as possible. As the blast wave moves away from the source, the blast pressure decreases by about a cubed rate; thus, every inch of distance is important.
- Before using the explosive chemical, determine what is the initiating mechanism or trigger that could lead to an explosion; this could be friction, pressure, impact, light, or heat. This knowledge will be a key in determining how to handle the chemical.
- For chemicals that deflagrate, eliminate, where possible, sources of confinement.
- Identify and eliminate sources of static discharge, which could be an initiating force for some explosives.
- Conduct transfers and other operations with compatible tools and equipment (use equipment that will not generate static electricity, sparks, or an area of friction).
- Do not attempt to crush or grind an explosive or apply other pressure to it unless it is explicitly known that the explosive is not sensitive to it with consideration given also to the amount of chemical being used.
- Where possible, dilute explosive wastes in a safe solvent. Most are more stable when dilute and some lose the ability to explode when wetted.
- Know what actions to take in an emergency.
- Ensure that an appropriate fire extinguisher is readily available.

***See the "Additional Information: Physical Hazards" factsheet for labeling and category charts.*



Resources

- [GHS Handbook, Revision 7 \(The Purple Book\)](#)
- [GHS Pictogram \(OSHA Quickcard\)](#)
- [Safety Data Sheet Information](#)
- [How to Read a Safety Data Sheet](#)

Deflagration and Detonation

These two classifications of explosions describe their respective hazards.

- **Deflagration** - very rapid combustion of particles of an explosive; combustion begins at one or more points and then "burns" very rapidly through the material
- **Detonation** - an almost instantaneous combustion of explosive material accompanied by high temperature-pressure wave formation; produces a true shock wave as a result of the explosion

The important difference between these classifications is that some chemicals that deflagrate burn slow enough that they need confinement to be explosive, whereas chemicals that detonate are dangerous without confinement.