

Safe Use of Compressed Gas and Fuel Storage: Protecting Workers Through Proper Handling and Compliance



Compressed gases and fuels are essential to countless industries across North America, from construction and manufacturing to healthcare, mining, agriculture, laboratories, utilities, and transportation. They power equipment, support critical industrial processes, enable welding and cutting operations, preserve food and medical supplies, and fuel vehicles and generators. However, when stored or handled improperly, compressed gases and fuels present serious hazards, including fire, explosion, toxic exposure, oxygen displacement, and high-pressure injuries.

For occupational health and safety (OHS) managers and worksite directors, developing effective storage, handling, and inspection procedures is a critical part of reducing risk, maintaining regulatory compliance, and protecting employees.

Common Types of Compressed Gases and Fuels

Different workplaces rely on different types of compressed gases and fuels depending on the work being performed. Some of the most common include:

- **Oxygen** for welding, cutting, healthcare, and laboratories.
- **Acetylene** for welding and metal fabrication.
- **Propane** for heating, forklifts, roofing, and construction equipment.
- **Carbon dioxide (CO₂)** for beverage systems, fire suppression, food processing, and laboratories.
- **Nitrogen** for manufacturing, tire inflation, chemical processing, and cryogenic applications.
- **Argon** for welding and industrial manufacturing.
- **Hydrogen** used in specialized manufacturing and energy applications.
- **Compressed natural gas (CNG)** for fleet vehicles.
- **Diesel and gasoline** stored for vehicles, generators, pumps, and heavy equipment.

Each product presents unique hazards. Flammable gases require ignition control, oxidizing gases increase fire intensity, toxic gases require exposure monitoring, and inert gases such as nitrogen can silently displace oxygen in enclosed spaces.

Industries Most at Risk

Compressed gases and fuels are used across numerous sectors, including:

- Construction
- Manufacturing
- Mining
- Utilities and energy
- Agriculture
- Warehousing and logistics
- Healthcare facilities
- Laboratories and research institutions
- Municipal public works
- Transportation and fleet maintenance

Because many worksites use several gas types simultaneously,

employers must ensure workers understand the specific hazards associated with each product rather than applying one set of procedures to all cylinders and fuel containers.

Safe Storage Practices

Proper storage is one of the most effective ways to prevent incidents involving compressed gases and fuels.

Compressed gas cylinders should always be stored upright and secured with chains, straps, or racks to prevent tipping. Protective valve caps should remain in place whenever cylinders are not connected for use, as damaged valves can turn a cylinder into a dangerous projectile.

Storage areas should be cool, dry, well ventilated, and protected from direct sunlight or excessive heat. Cylinders should never be exposed to temperatures beyond manufacturer recommendations, as heat increases internal pressure.

Employers should also separate incompatible materials. For example, oxygen cylinders should be stored away from fuel gases such as acetylene or propane, as well as combustible materials like oils, greases, paper products, and wood. Empty cylinders should be stored separately from full cylinders and clearly labelled to avoid confusion.

Fuel storage also requires careful planning. Diesel, gasoline, and propane should be stored in approved containers or tanks that are clearly labelled and located away from ignition sources. Spill containment measures should be available where required, and storage quantities should comply with applicable fire codes and local regulations.

Safe Handling and Use

Most incidents occur during handling rather than storage. Workers should never drag, roll, or drop compressed gas

cylinders. Cylinder carts designed specifically for gas transport should always be used.

Before connecting equipment, employees should inspect cylinders, regulators, hoses, fittings, and valves for damage or leaks. Connections should never be forced or modified to fit incompatible equipment.

When opening cylinder valves, workers should stand to the side rather than directly in front of the regulator, opening valves slowly to prevent pressure shock. Leak testing should be performed using approved leak detection solutions rather than open flames.

Fuel transfers should occur only in designated areas with adequate ventilation and appropriate fire protection equipment nearby. Engines should generally be shut down before refuelling unless specific operational procedures require otherwise.

Personal protective equipment (PPE) should be selected based on the specific hazard and may include safety glasses, face shields, gloves, flame-resistant clothing, respiratory protection, or hearing protection where appropriate.

Compliance and Best Practices

Effective compressed gas and fuel safety programs extend beyond basic storage requirements.

OHS managers should ensure workers receive task-specific training before handling compressed gases or fuels. Safety Data Sheets (SDSs) should be readily available, and all containers must be properly labelled in accordance with applicable hazard communication requirements.

Routine workplace inspections should verify that cylinders remain secured, storage areas are organized, fire extinguishers are accessible, ventilation systems are

functioning properly, and emergency shutoff procedures remain current.

Preventive maintenance schedules should include regulators, hoses, valves, storage racks, fuel tanks, and dispensing equipment. Employers should also establish emergency response procedures for leaks, fires, spills, and damaged cylinders, ensuring workers understand evacuation routes and reporting requirements.

Finally, regular audits help verify that workplace procedures continue to align with applicable OSHA requirements in the United States, Canadian occupational health and safety legislation, fire codes, and recognized industry standards.

When compressed gases and fuels are managed properly, they remain valuable tools rather than unnecessary risks. By combining proper storage, safe handling procedures, employee training, regular inspections, and continuous compliance monitoring, OHS managers can significantly reduce the likelihood of incidents while supporting safe, efficient operations across every worksite.