

Hydrogen BC | Hydrogen Safety & Emergency Response

Hydrogen has the potential to play a critical role in British Columbia's (BC's) shift to a low-carbon economy, with applications spanning transportation, energy, and industrial sectors. Like any energy source, hydrogen must be handled with care. A clear understanding of hydrogen's properties and appropriate safety measures are vital for its widespread adoption. To ensure safe use, industry and government have implemented robust best practices and dedicated resources to safety. Comprehensive guidelines, regulations, codes, and standards at both the provincial and national levels support the secure handling and integration of hydrogen across BC. Through stringent regulations and advanced technologies, BC is committed to maintaining the highest safety standards in its hydrogen initiatives.



HYDROGEN PROPERTIES

Hydrogen is a versatile energy carrier and is safe when handled properly. Hydrogen has unique properties that necessitate specific safety considerations:

- **Non-Toxic:** Hydrogen is non-toxic, meaning it does not pose direct toxicity risks to human health or the environment if released.
- **Rapid Dispersion:** As the lightest element, hydrogen disperses quickly into the atmosphere when released, reducing the risk of accumulation and ignition near the ground, unlike heavier fuels such as gasoline, diesel, or propane.
- **Flammability:** Hydrogen's flammability is a key consideration due to its wide flammability range and low ignition energy compared to traditional fuels. However, its rapid dispersion rate and low density significantly reduce the likelihood of dangerous accumulation.

HYDROGEN SAFETY MECHANISMS

Hydrogen's intrinsic properties, combined with robust engineering controls such as adequate ventilation, automatic shutoff mechanisms, and adherence to stringent safety standards, make hydrogen systems as safe, if not safer, than handling conventional fuels. Decades of safe industrial use further underscore hydrogen's reliability when managed correctly. In BC, several measures ensure the safe production, storage, and use of hydrogen:

- **Engineering Controls:** Hydrogen facilities incorporate robust ventilation systems, leak detection technologies, and automatic shutdown mechanisms to prevent and mitigate potential incidents.
- **Training and Protocols:** Personnel working with hydrogen should receive specialized training in handling procedures, emergency response, and maintenance of hydrogen systems.



To learn more go to www.canadah2bc.ca

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SAFETY MEASURES IN PRACTICE

Companies have implemented detailed safety measures for hydrogen refueling stations and fuel cell electric vehicles (FCEVs). These include:

- Installing pressure relief valves
- Keeping hydrogen tanks outside
- Ensuring electrical grounding
- Conducting comprehensive risk assessments
- Focusing on garage safety and overall facility safety elements
- Emergency response and maintenance of hydrogen systems

CODES AND STANDARDS

BC adheres to several codes and standards to ensure hydrogen safety:

- **Canadian Standards Association (CSA):** The CSA Group develops national standards for hydrogen production, storage, and handling, providing guidelines for safe practices.

[CSA Group standards, codes, and activities for the hydrogen ecosystem](#) →

EMERGENCY RESPONSE CONSIDERATIONS

In the event of a hydrogen-related incident, emergency responders follow specific protocols, which may vary depending on the type of incident (e.g., at refueling stations or involving FCEVs). The following steps outline general emergency response measures:

- **Assessment:** First responders assess the situation, identifying potential hydrogen leaks or fires, and establish safety perimeters.
- **Detection:** Given hydrogen's invisible flame, responders use thermal imaging cameras or specialized flame detectors to identify fires.
- **Suppression:** While hydrogen fires are typically allowed to burn out due to rapid dispersion, responders may use dry chemical extinguishers if necessary.
- **Ventilation:** Ensuring adequate ventilation is crucial to prevent hydrogen accumulation in confined spaces.

Additionally, hydrogen trucks and tanks are clearly marked with decals indicating their contents, which helps first responders quickly identify hydrogen and take appropriate safety measures. These decals are in accordance with established standards for transporting hazardous materials.



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REGULATORY OVERSIGHT

Energy regulation and technical safety organizations oversee the safety of hydrogen-related activities and technologies, ensuring compliance with provincial regulations and standards.

- **Technical Safety BC (TSBC)**
regulates end-use equipment and facilities, such as those related to vehicle transportation of hydrogen and hydrogen fueling stations.
- **BC Energy Regulator (BCER)**
is responsible for regulating energy resource development in BC. The regulator oversees the safe, sustainable, and environmentally responsible management of oil, natural gas, hydrogen, ammonia, methanol, carbon capture and storage, and geothermal projects. The BCER ensures compliance with health, safety, and environmental standards while engaging with Indigenous communities and the public.



RESOURCES

To further support safe hydrogen adoption, additional resources are available:



[Hydrogen Emergency Response Training for First Responders](#)

This online and in-person training equips emergency personnel with skills to address hydrogen-related incidents.



[Hydrogen Safety Best Practices Manual](#)

An online resource that consolidates decades of expertise and practical experience in the safe handling and use of hydrogen.



[Safety Checklists and Guides](#)

Industry professionals can access detailed safety checklists and risk assessment tools via the H2Tools Safety Portal.



[Municipal Permitting Case Study](#)

This case study highlights the City of Prince George's approach to hydrogen project permitting, including zoning, bylaws, costs, and timelines, offering a model for other municipalities.



[Hydrogen Station Permitting Guidebook](#)

This guidebook provides comprehensive information on the permitting process for hydrogen fueling stations in BC, outlining safety requirements and best practices.