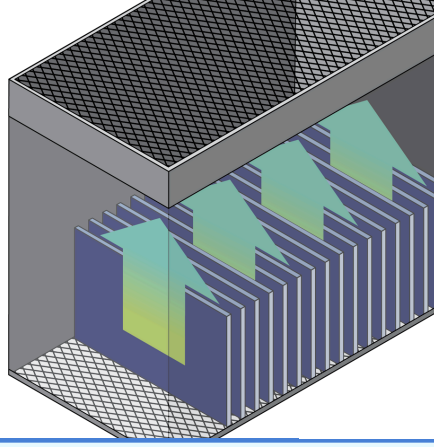
Canadian Nuclear Laboratories | Laboratoires Nucléaires Canadiens

Safe Hydrogen Mitigators

A compact device that converts hydrogen into water vapour.



How They Work

The catalyst structure inside the mitigator is coated with a proprietary CNL formulation that enables the hydrogen and oxygen (from the air) to react at room temperature and generate water vapour.

When mixed with air, hydrogen becomes flammable at a 4% concentration. The mitigator self-starts at less than 1% and keeps the hydrogen concentration under this level indefinitely, preventing the risk of fire and explosion.

Self-starting with no power required

Fits any facility

Meets nuclear QA standards

Products of Hydrogen Mitigator

Passive Hydrogen Recombiners

- For the prevention of hydrogen accumulation by natural convection.
- Rectangular plate catalyst structure.
- Multiple devices can be bundled depending on application and facility size.

Active Hydrogen Recombiners

- For vents, purge, and exhaust for hydrogen systems by forced flow.
- Jelly roll style catalyst structure.
- Customised to fit the desired application.

Trickle Bed Hydrogen Recombiners

- For use in hydrogen-rich chemical processes.
- Catalyst bead structure is cooled with water.
- Customised to fit the desired application

Facilities

Spaces with hydrogen present

- Hydrogen production, storage, and transport facilities.
- Hydrogen vehicle parking, fueling, and repair facilities.
- Underground mining.
- Transportation tunnels.
- Battery storage rooms.
- Marine vessels.
- Chemical production and processing facilities.

CNL can develop custom mitigators for specific applications upon request.

Improved fire safety

Improved worker safety

Get In Touch

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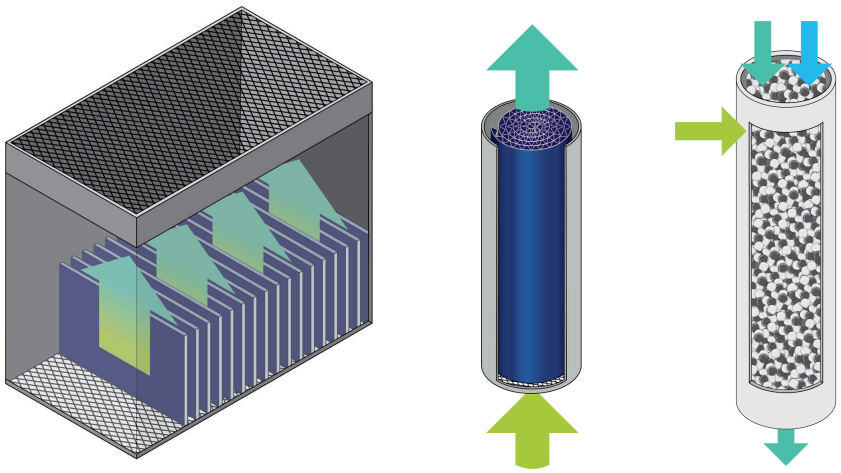
Technical information

$$H_2 + \frac{1}{2}O_2 \leftrightarrows H_2O + heat$$

The Hydrogen Mitigation System



Operation Conditions	Passive Hydrogen Recombiner	Active Hydrogen Recombiner	Trickle Bed Recombiner
Geometry	Rectangular	Cylindrical	Cylindrical
Catalyst structure	Sheet	Monolith	Beads
Hydrogen Concentration Range (%)	0.5 - 7%	0 - 4%	0 - 100%
Removal Efficiency (maximum %)	65%	100%	100%
Minimum start-up temperature (°C)	-10	-10	20
Relative Humidity (%)	0 - 100%	0 - 100%	100%

Various catalyst materials and catalyst forms are available to suit different applications (e.g., spheres, rings, pellets, granules, screens, and monoliths).

CNL's passive hydrogen recombiners are installed at nuclear power plants in:

- Canada
- Finland
- France
- S. Korea
- Ukraine