Hydrogen Storage

Hydrogen storage and usage demand careful attention to safety measures and protocols to prevent potential risks and hazards. When storing hydrogen, it is essential to position it outside, maintaining a safe distance from structures, ventilation intakes, and vehicle routes. The required separation distance is typically determined by the leak rate potential and varies based on factors such as storage volume, pressure, and pipe diameter. Specific separation distance guidelines can be found in NFPA 2.

For indoor hydrogen usage, the recommended practice involves storing hydrogen outdoors and transferring it to indoor users through welded piping. Compressed gas is typically housed in cylinders or pressure vessels designed for high-pressure gases, while liquid hydrogen is stored in vacuum-insulated cylindrical tanks at relatively lower pressures. Indoor hydrogen usage demands a comprehensive suite of safety precautions. Structures must be constructed using noncombustible materials to minimize fire risks, while mechanical ventilation systems should ensure airflow from lower levels and exhaust at the room's highest point, promoting effective circulation and preventing the buildup of hazardous hydrogen concentrations. Crucially, hydrogen sensors must be installed to swiftly detect leaks, enabling timely interventions. Automated shutdown systems upon leak or fire detection are essential for rapid hazard mitigation. The elimination of ignition sources is achieved through specialized electrical equipment, curbing sparking risks. Additionally, the meticulous electrical bonding and grounding of hydrogen system components prevent static electricity buildup and further reduce fire and explosion hazards. In concert, these measures create a secure indoor hydrogen environment, safeguarding personnel, facilities, and surroundings from potential hydrogen-related risks.

When hydrogen cylinders are stored outdoors with weather protection, similar considerations as those for indoor use apply to the weather protection structure.

Read more about this and other hydrogen safety topics at www.h2tools.org.
Please contact us at chs@aiche.org if you have a suggestion for a future topic.