NFPA 2:
Hydrogen Technologies Code

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Esh Professional | Founder **www.Omitz.io**

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AGENDA:

- **1:00 – 2:00 PM**
  - Introduction & NFPA 2 Overview (Ch1)
  - General Fire Safety Requirements (Ch4)
  - Performance-Based Option (Ch5)
  - General H2 Requirements (Ch6)
- **2:15 – 3:30 PM**
  - Gaseous H2 Requirements (Ch7)
  - Liquefied H2 Requirements (Ch 8)
  - H2 Fuel Cell Power Systems (Ch 12)
  - H2 Generation Systems (Ch13)

2

2

Key Learning Objectives

- **Learning Objective 1:** Grasp the critical role of NFPA 2 in promoting a safe and sustainable Hydrogen Economy.
- **Learning Objective 2:** Confidently navigate and interpret key elements and general hydrogen requirements within NFPA 2.

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About Me

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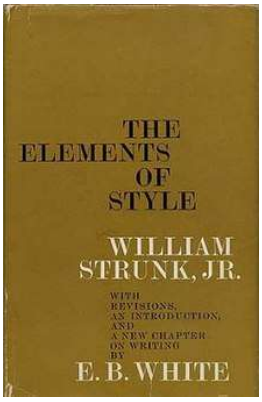
About Omitz



Rule 17: "Omit Needless Words"

Safety Tools, Training, and Resources for Hydrogen Innovators

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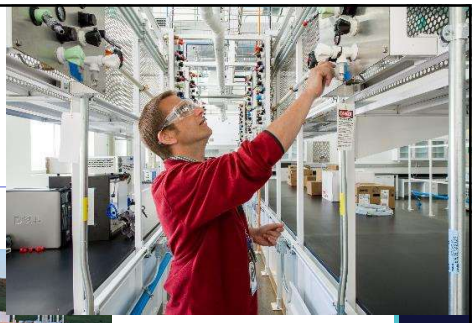
Hydrogen



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INTRODUCTION

WHO ARE YOU? | WHY HYDROGEN?

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NFPA 2: What is it?

MODEL CODE

Set of **guidelines** that are used as a **basis** for creating **local codes**

GUIDELINES

Production, **storage**, **transfer** and **use** of hydrogen in gaseous and liquid forms

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NFPA 2: What it is NOT?

REGULATION

Adoption into **law** depends on **local or national jurisdictions**. It is not a legal requirement in all districts

PRODUCT CERTIFICATION

Does not provide certification for **products** or **equipment**. It doesn't assure **product compliance**.

TRANSPORT/PROPULSION

Doesn't cover design or components related to **hydrogen transport or propulsion** of hydrogen motor vehicles

IMPLEMENTATION

Enforcement is up to the **Authority Having Jurisdiction (AHJ)** in the specific area

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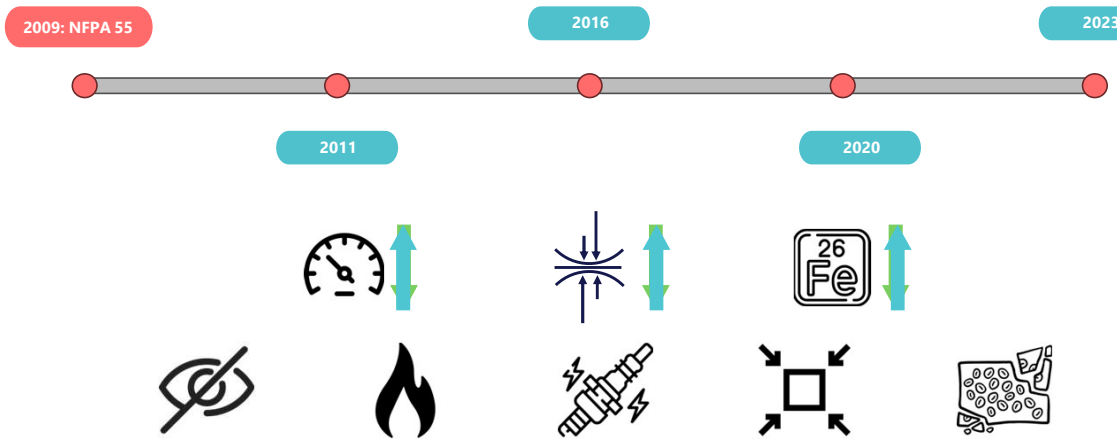
NFPA 2: History



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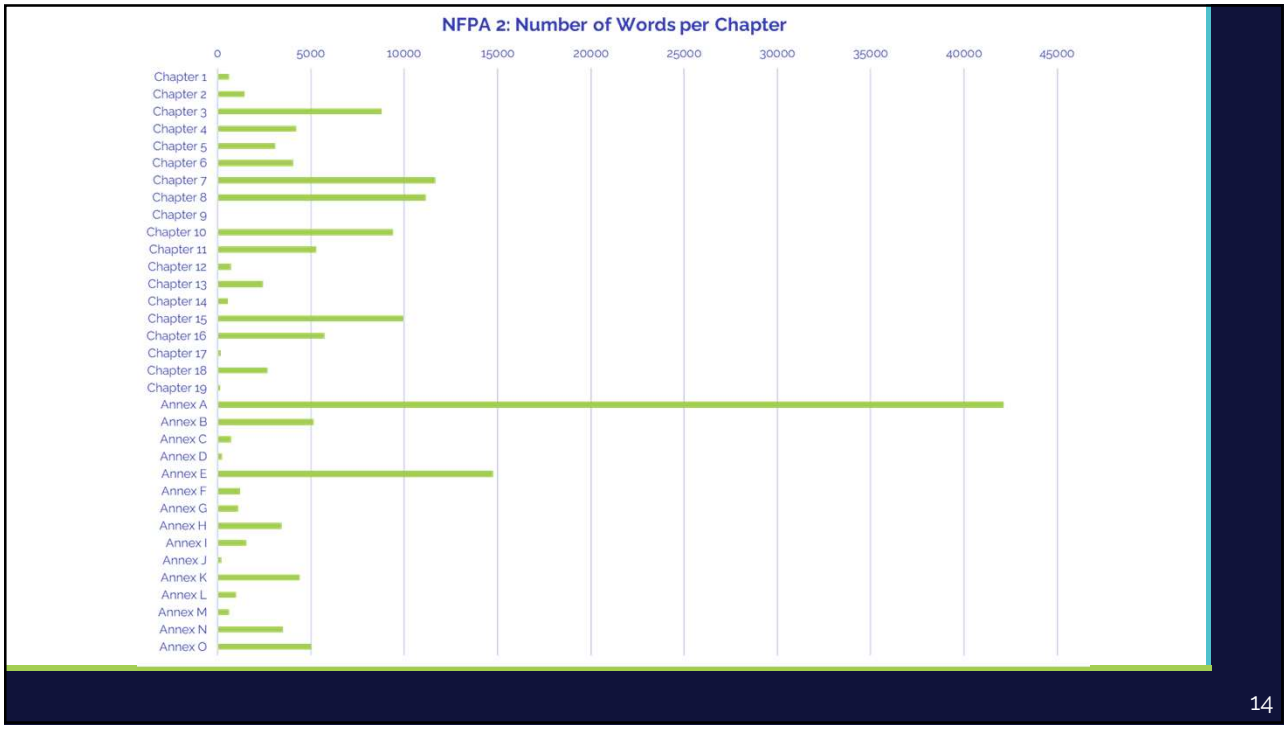

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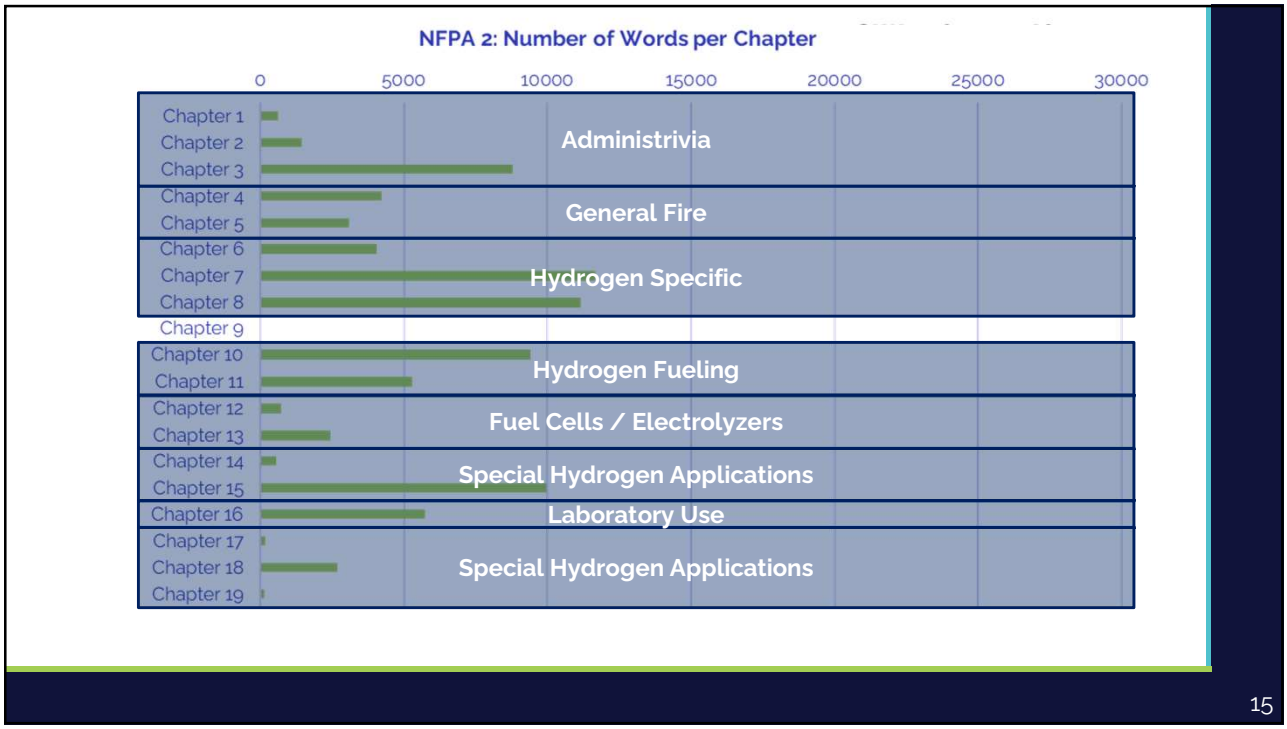

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Ch 1: Administration

WHEN DOES THIS CODE APPLY

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1.1 Administration - **Scope | Purpose | Application**

1.1 Scope
1.2 Purpose
1.3 Application
1.4 Retroactivity
1.5 Equivalency
1.6 Units and Formulas
1.7 Enforcement

Scope

Includes **production**, **storage**, **transfer**, and **use** of hydrogen

Purpose

Provide fundamental safeguards for the **generation**, **installation**, **storage**, **piping**, **use**, and **handling** (GH2 and LH2)

Application

Applies to **stationary, portable, and vehicular infrastructure** applications.

Chapters **1** and **4-8** are fundamental for **all**.
Chapters **9-19** apply **as applicable.**

Exemptions

- transport of hydrogen
- propulsion of hydrogen vehicles
- mixtures of GH2 with less than 95% hydrogen
- storage of metal hydride materials outside defined storage systems

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1.1 Administration - **Exemptions | Retroactivity | Equivalency**

1.1 Scope
1.2 Purpose
1.3 Application
1.4 Retroactivity
1.5 Equivalency
1.6 Units and Formulas
1.7 Enforcement

Equivalency

Systems, methods, or devices of **equivalent** or **superior** quality are allowed **if approved** by the **AHJ**. Must submit **documentation**.

Retroactivity

Code **doesn't** apply to facilities that existed or were approved before the effective date of the code, unless otherwise specified.

The AHJ has the authority to **apply** portions of the **code retroactively** and to **modify requirements** if application is impractical (1.4.3).

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1.1 Administration - **Units & Formulas | Enforcement**

1.1 Scope
1.2 Purpose
1.3 Application
1.4 Retroactivity
1.5 Equivalency
1.6 Units and Formulas
1.7 Enforcement

Users must use **one** consistent system of units. **Precision** is appropriate for **practical** application

Enforced by the **AHJ**, as designated by the governing authority (ABC)

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Ch 4: GENERAL FIRE SAFETY REQUIREMENTS

APPLIES TO EVERYTHING

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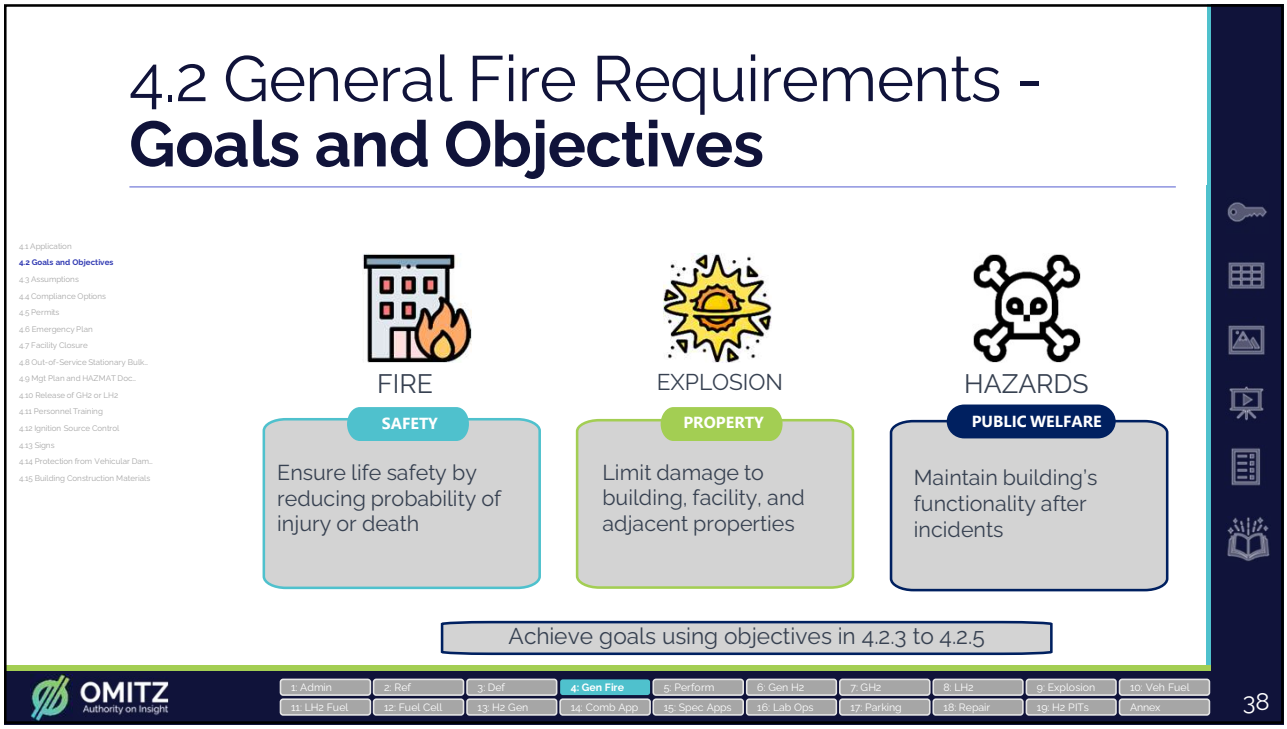

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4.3 General Fire Requirements - **Assumptions**

ONE RELEASE

Single hazardous material release assumption

ONE FIRE

Single fire source assumption

IMPINGE

Incidents impinging on hazardous materials

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4.4 General Fire Requirements - **Compliance Options**

PERFORMANCE

Chapters 1-5

PRESCRIPTIVE

Chapters 1-4, 6-18

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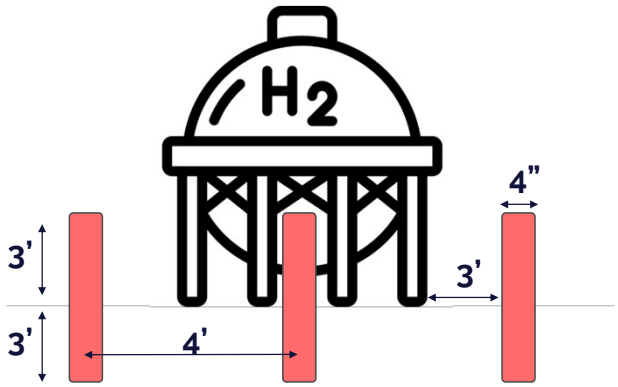
4.14 General Fire Requirements - **Protection from Vehicular Damage**



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4.15 General Fire Requirements - **Building Construction Materials**

NONCOMBUSTIBLE	LIMITED-COMBUSTIBLE
Doesn't ignite, burn, support combustion, or release flammable vapors when exposed to fire or heat And... Passes the ASTM E136 test or complies with the pass/fail criteria of ASTM E136 when tested under ASTM E2652. *Is considered a limited-combustible.*	Not noncombustible Should not release more than 3500 Btu/lb (8141 kJ/kg) of heat when burned Noncombustible base with a thin surface that doesn't spread fire quickly, OR it should be made of materials that don't spread fire quickly or keep burning when cut open. Exposed to 75 kW/m2 for 20 minutes. If the peak heat release rate doesn't exceed 150 kW/m2 for more than 10 seconds, and the total heat released doesn't exceed 8 MJ/m2

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Ch 5: PERFORMANCE-BASED OPTION

CAN'T MEET REQUIREMENTS? ASSESS RISK.

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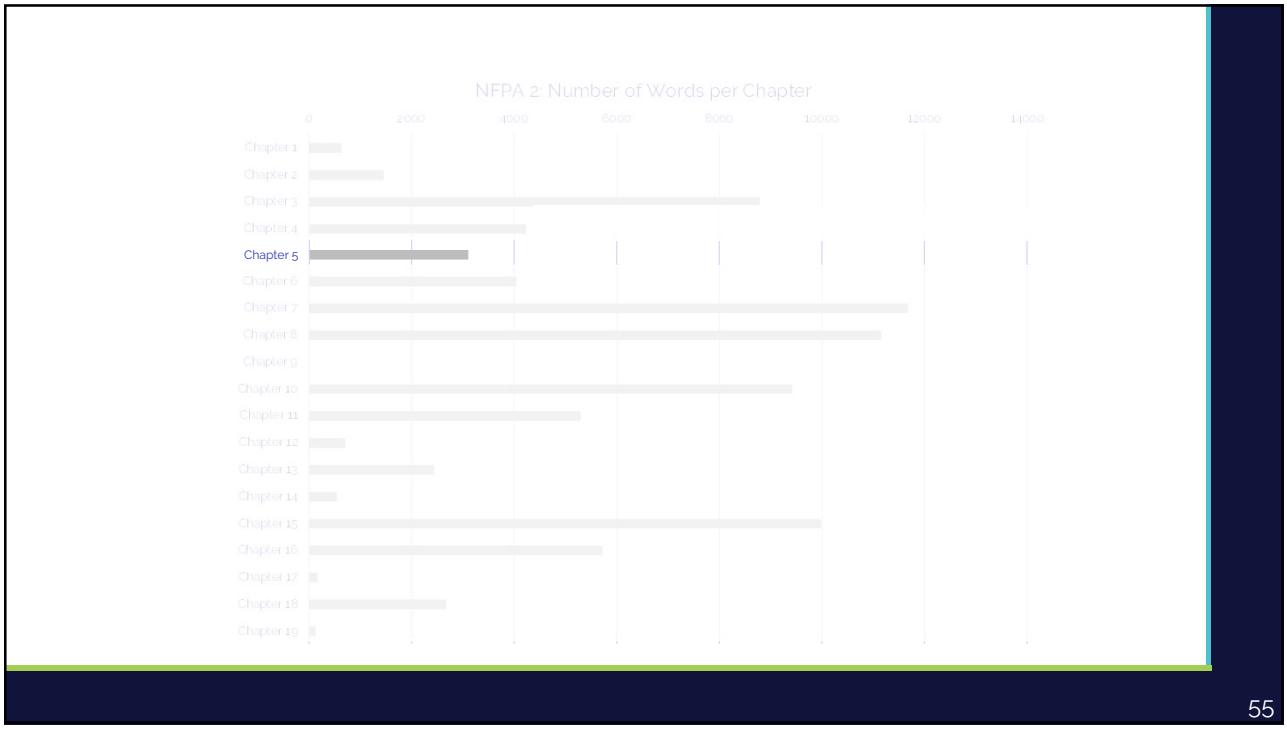

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5.1 Performance Based-Options-**General**

5.1 General
5.2 Performance Criteria
5.3 Retained Prescriptive Reqs
5.4 Design Scenarios
5.5 Evaluation of Proposed Designs
5.6 Safety Factors
5.7 Documentation Requirements

Goal/Objective
Meet code intent

Qualifications
Must be prepared by a qualified person

Documentation
Owner submits performance objectives and design details

Independent Review
AHJ can require 3rd party review

Data
Identify and document data sources

Final Decision
AHJ determines if objectives are met

Manual
Provide and maintain manual on-site

Info Share
Designer shares operations with team (including fire service)

Maintenance
Owner maintains design features

Annual Cert
Certifies design feature & system maintenance

Operations
Provide and maintain manual on-site

HAZMAT
Addresses safety objectives for HAZMAT

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5.2 Performance Based-Options-**Performance Criteria**

5.1 General
5.2 Performance Criteria
5.3 Retained Prescriptive Reqs
5.4 Design Scenarios
5.5 Evaluation of Proposed Designs
5.6 Safety Factors
5.7 Documentation Requirements

FIRE
EXPLOSION
HAZMAT
PROPERTY PROTECTION
PUBLIC WELFARE
UNTENABLE CONDITIONS
EMERGENCY RESPONDER PROTECTION
STRUCTURAL FAILURE

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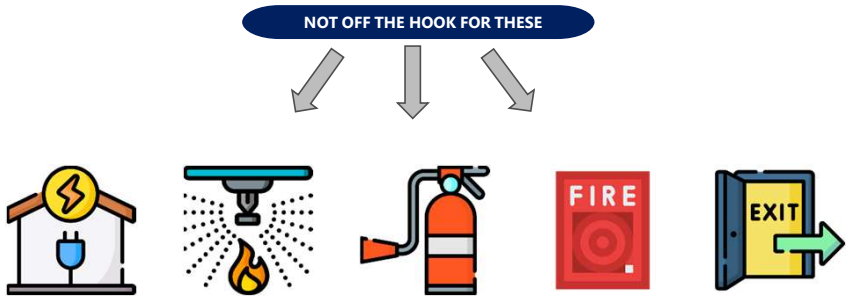
5.3 Performance Based-Options- **Retained Prescriptive Requirements**



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5.4 Performance Based-Options- **Design Scenarios**

GENERAL	SPECIFICS	SCENARIOS
•Design meets goals & objectives for each required scenario •AHJ approves parameters for design scenarios •Scenarios evaluated using AHJ-approved method •Challenging and realistic scenarios	•Include scenarios specified in 5.4.2-5.4.5 → •Inappropriate scenarios not required to be evaluated •Translate scenarios into input data specifications •Identify and analyze omitted or modified specifications	•**Fire:** Performance-based building design for life safety •**Explosion:** Prevention/mitigation of ruptured H2 pressure vessel, deflagration, detonation •**Hazardous Materials:** Unauthorized release, exposure fire, external factors, protection system failure •**Safety During Building Use:** Maximum occupant load, construction/demolition fire

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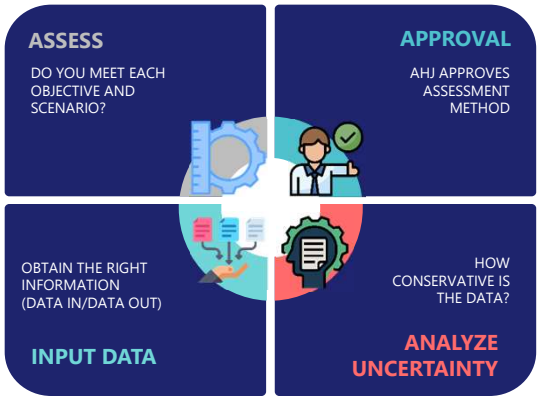
5.5 Performance Based-Options- **Evaluation of Proposed Designs**



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5.6 Performance Based-Options- **Safety Factors**

INCLUDE SAFETY FACTORS

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5.7 Performance Based-Options- **Documentation Requirements**

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Ch 6: GENERAL HYDROGEN REQUIREMENTS

REQUIREMENTS FOR ANY USE OF HYDROGEN

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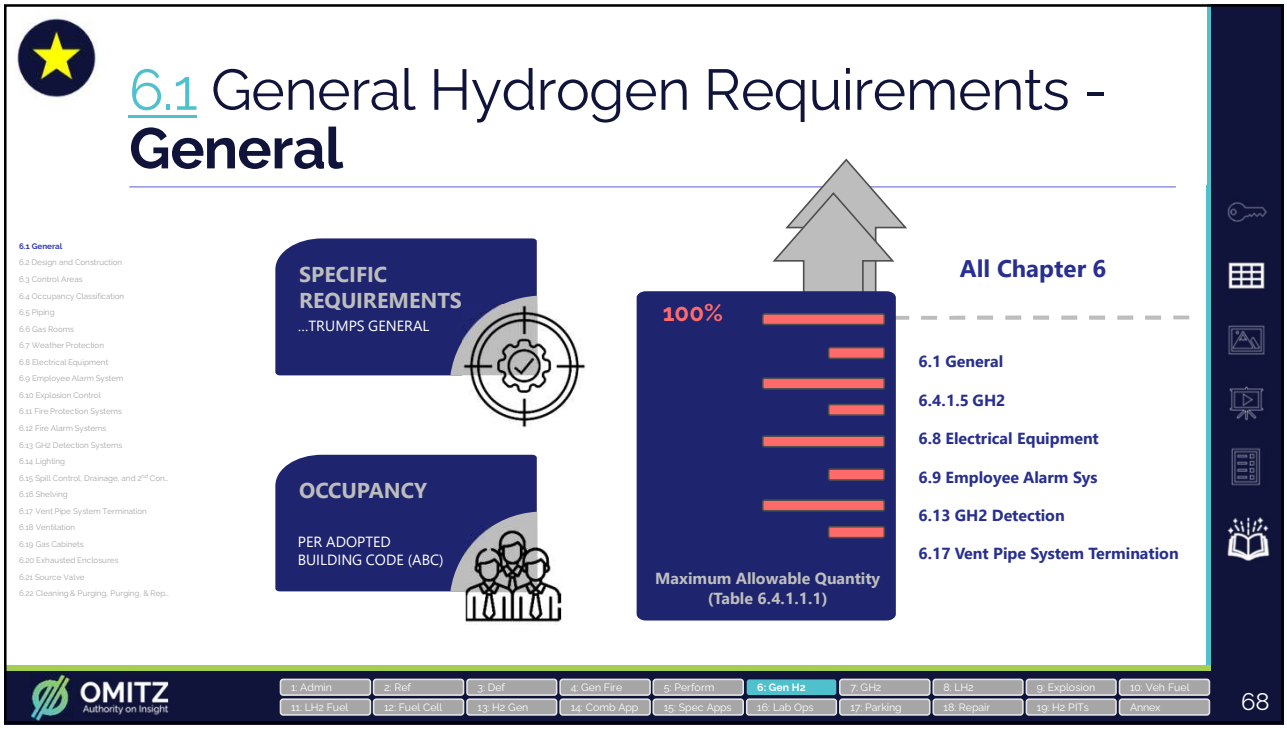

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6.2 General Hydrogen Requirements - **Design & Construction**

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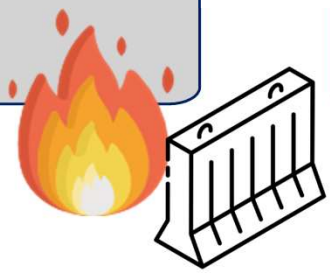
6.3 General Hydrogen Requirements – **Control Areas**

BOUNDARY

Determined by **fire barriers**



MAXIMUM

Max number of control areas per **Adopted Building Code**

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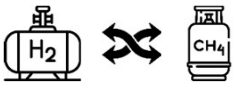
6.4 General Hydrogen Requirements – **Occupancy Classification**

PERMISSIBLE OCCUPANCIES?

- LABORATORY
- INDUSTRIAL/STORAGE



Multiple Hazards?
NFPA 55 required too

THRESHOLDS
Exceedances and venting requirements spelled out (Table 6.4.1.1.1)

AGGREGATE
Use/Storage make up allowable quantities

Chapter 7 details what can't be near hydrogen gas

INCOMPATIBLE MATERIAL

Per Adopted Building Code

CLASSIFICATION

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6.5 General Hydrogen Requirements – **Piping**

- DESIGN & INSTALL ASME B31 | IFGC
- INSPECTION & PRESSURE TESTING
- BRAZING (> 1000 F)
- GAS TIGHT
- BACKFLOW PREVENTION PROVIDED
- SPECIFIED FOR H2 SERVICE
- ACCESSIBILITY & PROTECTION AGAINST TAMPERING
- VENTILATION FOR CABINETS/ENCLOSURES
- MOBILE HYDROGEN SUPPLY UNITS SECURED / ELECTRICALLY BONDED

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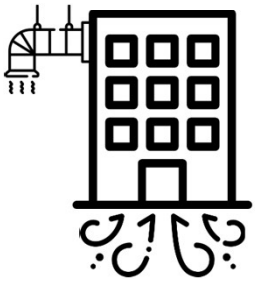
6.6 General Hydrogen Requirements – **Gas Rooms**



STORAGE

USE

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6.8 General Hydrogen Requirements – **Electrical Equipment**

Electrical Standard for Industrial Machinery

NFPA 79

NFPA 70

National Electric Code

Standard for Emergency and Standby Power Systems

NFPA 110

NFPA 111

Standard on Stored Electrical Energy Emergency and Standby Power Systems

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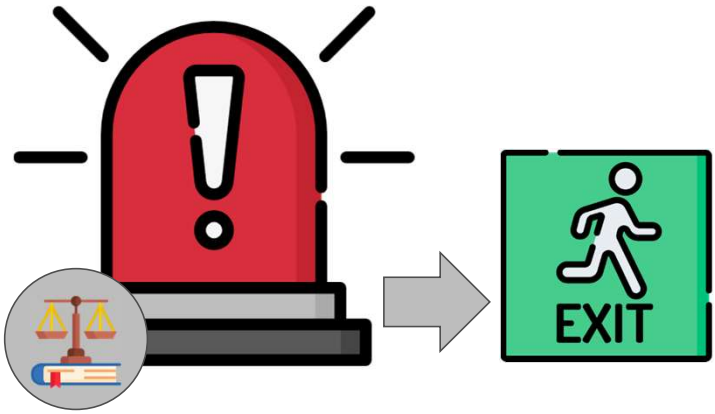
6.9 General Hydrogen Requirements – **Employee Alarm**



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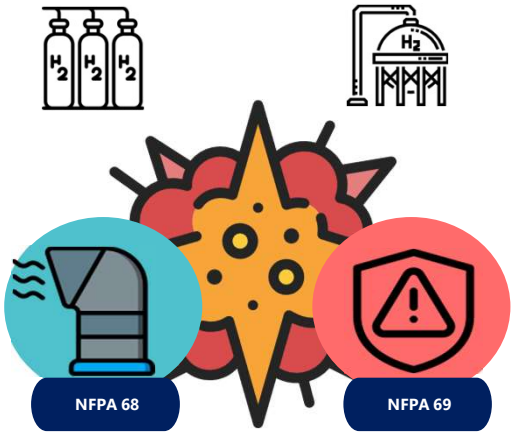
6.10 General Hydrogen Requirements – **Explosion Control**



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6.13 General Hydrogen Requirements – **GH2 Detection System**

Design | Installation | Testing | Inspection | Calibration| Maintenance

LISTED

Detector system must be listed/approved

Testing

Annual testing

RECORDS

3-year record retention

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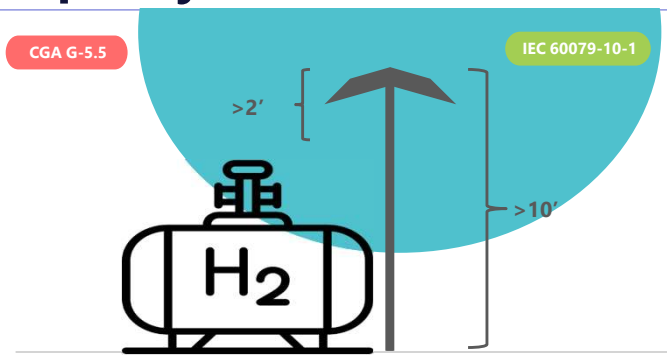
6.17 General Hydrogen Requirements – **Vent Pipe System Termination**



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6.17 General Hydrogen Requirements – **Vent Pipe System Termination**

CGA G-5.5

IEC 60079-10-1

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6.18 General Hydrogen Requirements – **Ventilation**

EXHAUST

Mechanical Exhaust or Fixed Natural Ventilation

RATE

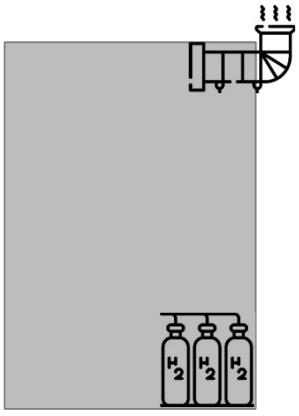
1 scf/min/ft2 of floor area

Adopted Mechanical Code

CODE

Continuous Operation (manual emergency shutoff outside of room)

ALWAYS ON



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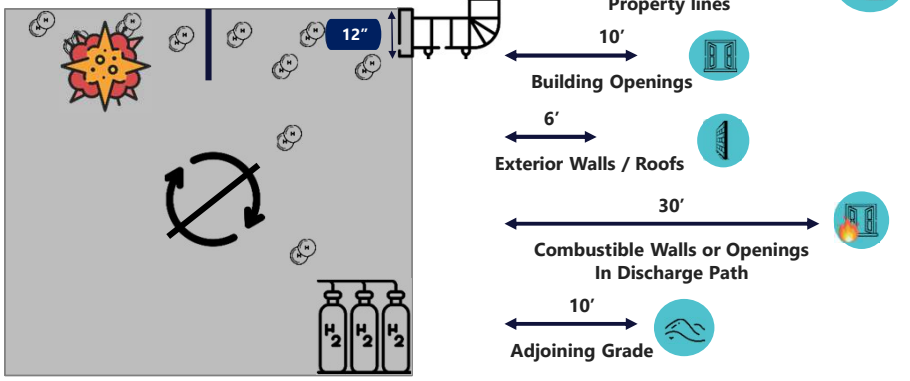
6.18 General Hydrogen Requirements – **Ventilation**



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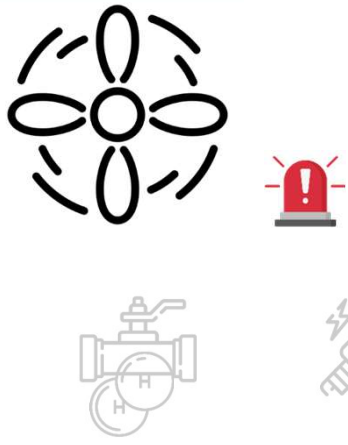
6.18 General Hydrogen Requirements – **Ventilation (cont...)**



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6.19 General Hydrogen Requirements – **Gas Cabinets**

CONSTRUCTION

12 Guage steel
Self closing door
Self closing limited access port/window

VENTILATION

Negative to surrounding areas

Incompatible gases stored or used in separate gas cabinets (as defined by Table 7.2.1.1)

INCOMPATIBLES

Max three (3) cylinders/cabinet

Can increase overall MAQ

QUANTITY LIMITS

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6.20 General Hydrogen Requirements – **Exhausted Enclosure**

CONSTRUCTION

A top, back, and two sides. Are internally sprinklered

VENTILATION

Negative to surrounding areas

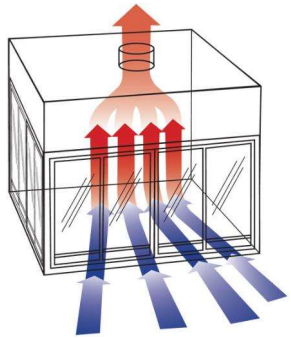
Incompatible gases stored or used in separate gas cabinets (as defined by Table 7.2.1.1)

INCOMPATIBLES

Separated in accordance with Table 7.2.1.1

Can increase overall MAQ

QUANTITY LIMITS



Environment Enclosures (hemcocorp.com)

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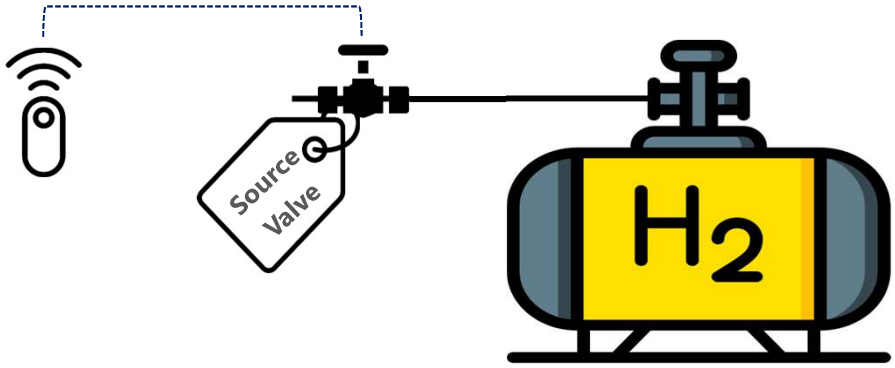
6.21 General Hydrogen Requirements – **Source Valve**



BULK GAS

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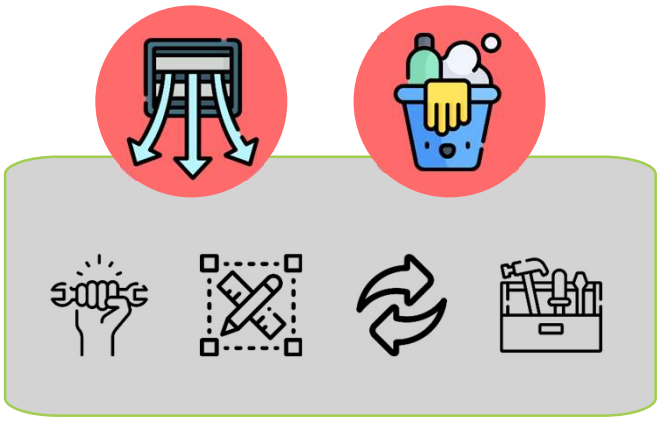
6.22 General Hydrogen Requirements – **Cleaning | Purging | Repair of Piping**



Ops | Proc | Haz ID

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6.22 General Hydrogen Requirements – **Cleaning |Purging| Repair of Piping Sys**

Onsite | Provided to Workers | AHJ Access

Written | Technical Basis | ESH Implications | Permanence (?) | Training | Modifications | Authorization

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6.22 General Hydrogen Requirements – **Cleaning |Purging| Repair of Piping Sys**

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Ch 7: GASEOUS HYDROGEN

HYDROGEN GAS PHASE REQUIREMENTS

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7.1.1 Gaseous Hydrogen
General

APPLICABILITY

Storage, Use, & Handling of GH2

OTHER CHAPTERS

Specific requirements apply elsewhere. Specifics trump this chapter.

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7.1.2-3 Gaseous Hydrogen
GH2 Systems | Listed Equipment

Designed for and by competent people

Knowledgeable Supervisor

Prevent unintended flow

GH2 gas?
GH2 Components

Follow Listing Reqs and Mfctr Instructions

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7.1.5 General – Cylinders, Containers, & Tanks (CCT)

DESIGN/ CONSTRUCTION

Defective items returned, repaired, removed, destroyed

Supports non-combustible

Containers with residual treated as full

Pressure Relief

CGA. Compressed Gas Association

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7.1.6 General – Labeling Requirements

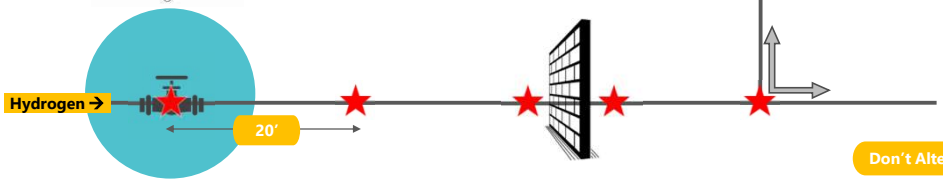
NFPA

Stationary Container

Mobile Container

Warning: Hydrogen
Flammable Gas
No Smoking – No Open Flames

Piping



Don't Alter!!

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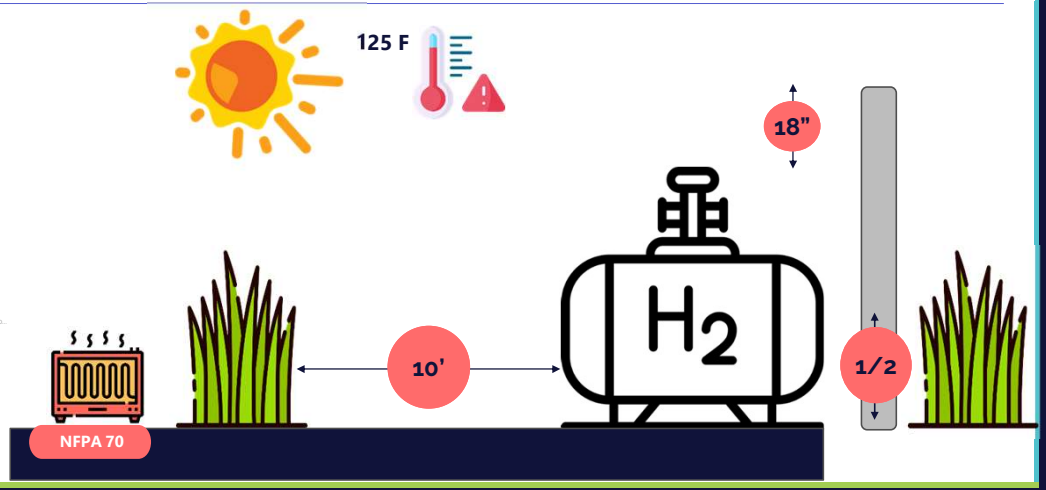
7.1.9 General - Separation from Hazardous Conditions



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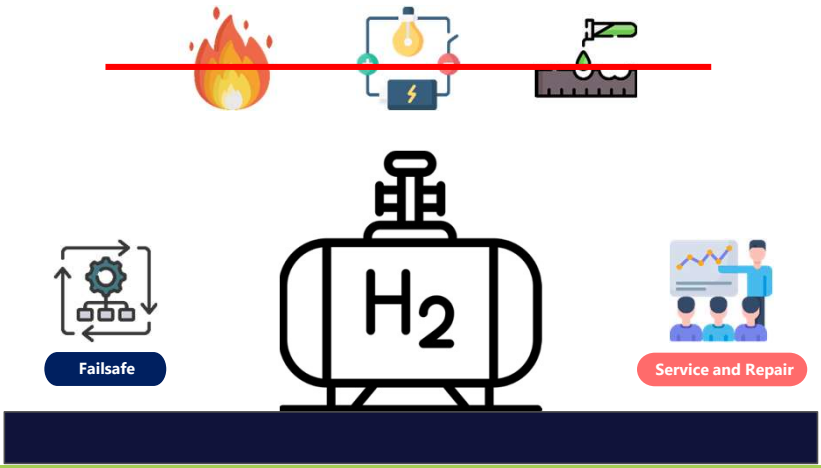
7.1.9 General - Separation from Hazardous Conditions



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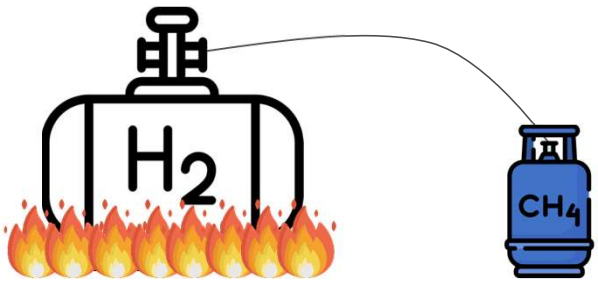
7.1.10-12: General
Unauthorized Use | Exposure to Fire



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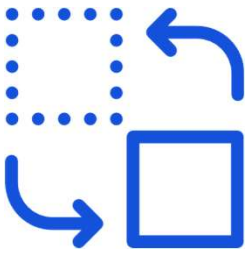
7.1.13 General –
Leaks, Damage, and Corrosion



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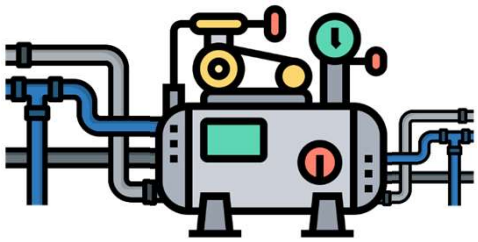
7.1.19 General – Compression and Processing Equip.



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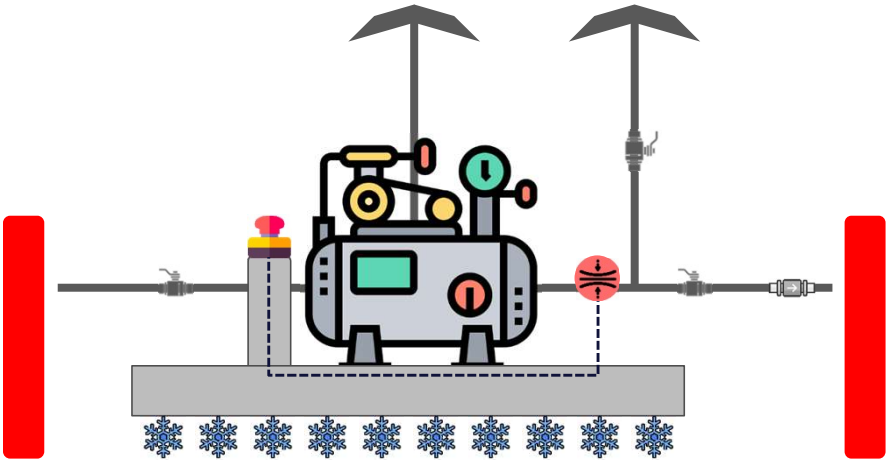
7.1.20 General – Stationary Compressors



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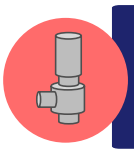
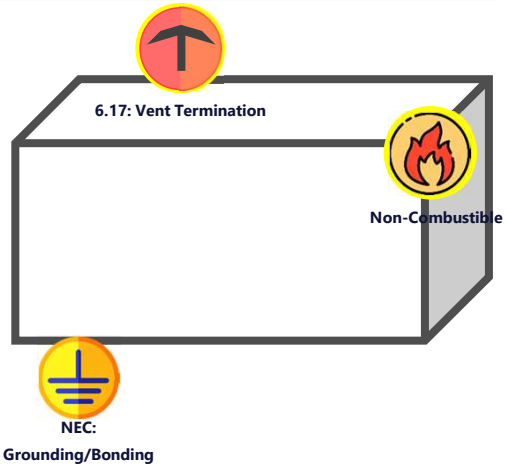
7.1.23 General – Hydrogen Equipment Enclosure (HEE)

Quantity >1000 ft³ or Generate H2

Exceptions:

- Gas Cabinets
- Exhausted enclosures
- Ventilated enclosures
- Fuel Cell Systems
- Hydrogen Generators





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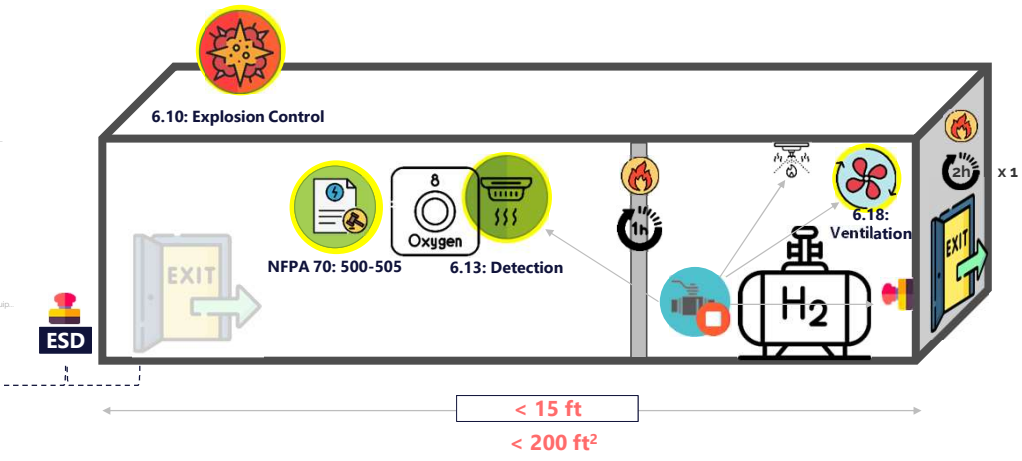
7.1.23 General – Hydrogen Equipment Enclosure (HEE)



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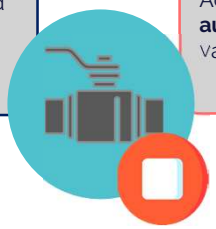
7.1.24 General – **Emergency Shutoff Valves**

Location

Point of **use**, **tank**, and **building** entry

Accessible

Accessible **manual / automatic** shutoff valves



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7.1.24-25 General – **Emergency Isolation**

Location

As close as practical to bulk source (tied to leak detection)

Labeling

Constantly monitored control station w/gas supply shutoff

Programs

Attended control station w/ trained personnel to trigger response

Procedures

Excess flow valve at bulk source

Exemptions

- Piping for pressure relief devices
- Piping inlet prevents backflow at source
- Systems < 430 ft³

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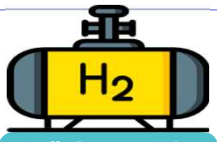
7.1.26 General – **Ignition Source Control**

Gas IE = | H2 IE = 0.012 mJ

Ground Static Producing Equip

126

7.2-3 GH2 | 8.2-3 LH2 **Non-Bulk/Bulk Storage**



	Non-Bulk Gaseous (7.2)	Bulk Gaseous (7.3)	Non-Bulk Liquid (8.2)	Bulk Liquid (8.3)
Quantity Limit	MAQ < 5000 scf	> 5000 scf	< 39.7 gallons	> 39.7 gallons
Indoor Storage		7.3.2.2.1	8.3.2.2.1.4	8.3.2.2.1.4
Outdoor Storage	7.2.2.3.2	7.3.2.3.1(B)(a)	8.2.2.3.4	8.3.2.3.1.6(a)
Distance Reduction: Passive				
Distance Reduction: Active	NA		NA	

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7.2.1 GH2: Non-Bulk - **General**

7.2.1 General
7.2.2 Non-Bulk GH2 Storage
7.2.3 Non-Bulk GH2 Use
7.2.4 Non-Bulk GH2 Handling

Bulk Separation

Closed Piping (Bulk Separation Exempt)

Fire Barrier @ 0.5 hr (Reduce w/o Limit)

No PRD? No Reduction

Mixed Gas? NFPA 55

Incompatible Materials Separation

Gas Category	Distance	Gas Cabinet (One)	Gas Cabinet (Both)
Toxic	20 ft	5 ft	0 ft
Pyrophoric	20 ft	5 ft	0 ft
Flammable	-	-	-
Oxidizing	20 ft	5 ft	0 ft
Corrosive	20 ft	5 ft	0 ft
Unstable (2, 3, 4)	20 ft	5 ft	0 ft
Other	NR	NR	NR

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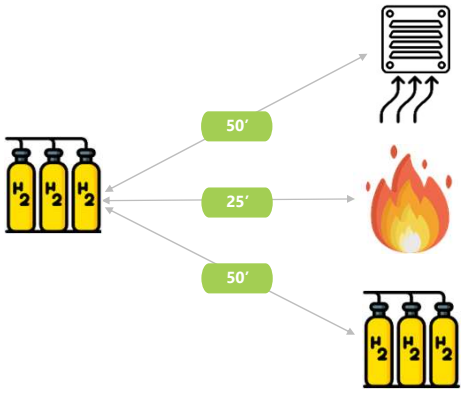
7.2.2 GH2: Non-Bulk – **Storage: Indoor**

7.2.1 General
7.2.2 Non-Bulk GH2 Storage
7.2.3 Non-Bulk GH2 Use
7.2.4 Non-Bulk GH2 Handling



(10' w/ room classification, detection @25% LEL, & H2 shutoff, and ESV per 7.1.24

(0' w/ fire partition; 25' if free of combustibles and sprinklered to Extra Hazard Group 1 (6.11)

Incompatible Materials

NFPA 70: 500 & 501

6.18: Ventilation

Protect from Damage

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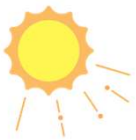
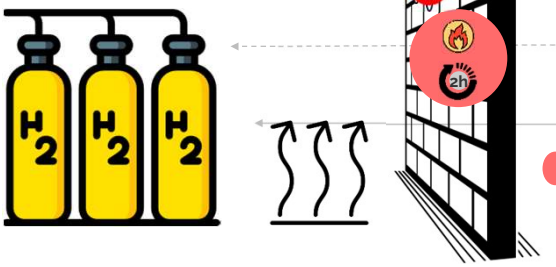
7.2.2 GH2 Non-Bulk – **Storage: Outdoor**

7.2.1 General
7.2.2 Non-Bulk GH2 Storage
7.2.3 Non-Bulk GH2 Use
7.2.4 Non-Bulk GH2 Handling





Non-Reducible

- 25' - Building Openings
- 20' – Air Intakes

Separation Distances (Table 7.2.2.3.2) reduced w/o limit if...

Independent

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7.3.2.2 GH2 Bulk – **Storage: Indoor (Detached Building)**

7.3.1 Bulk GH2 Systems – General
7.3.2 Bulk GH2 Systems Storage
7.3.2.1 General
7.3.2.2 Indoor
7.3.2.3 Outdoor
7.3.2.4 Underground
7.3.2.5 Courts
7.3.3 Bulk GH2 Systems Use
7.3.4 Handling of Bulk GH2 Systems
7.3.5 Maintenance

- Openings at high point
- Openings > 1ft²/1000ft³
- Directed to atmosphere

Location
See Table 7.3.2.2.1

Detached Building

- 6.18: Ventilation
- 6.6: Non-Combustible
- NFPA 70: 500 & 501
- 6.10: Explosion Control
- Indirect Heat

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7.3.2.2 GH2: Bulk – **Storage: Indoor H2 Gas Rooms**

Hydrogen Gas Room

- 6.18: Ventilation
- 6.6: Non-Combustible
- NFPA 70: 500 & 501
- 6.10: Explosion Control
- Indirect Heat

Interior Walls
2hrs, continuous from floor to ceiling, anchored to resist movement

Perimeter Walls
25% should be an exterior wall

Exterior Walls
Only place for windows and doors

Openings
No openings to other parts of the building

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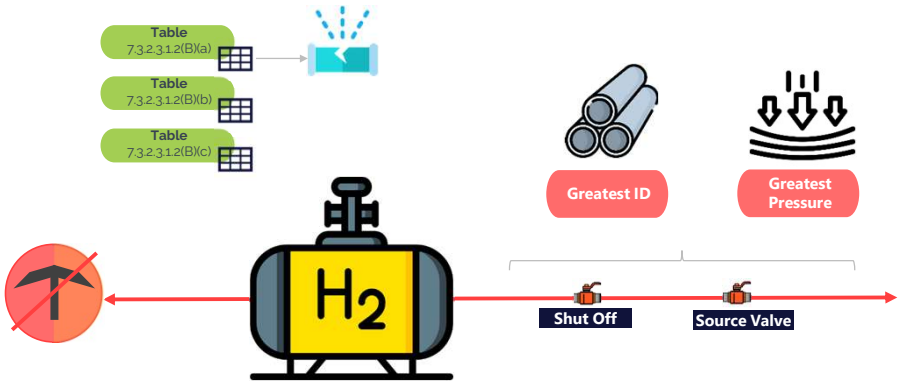
7.3.2.3 GH2 Bulk – **Storage: Outdoor (Above Ground)**



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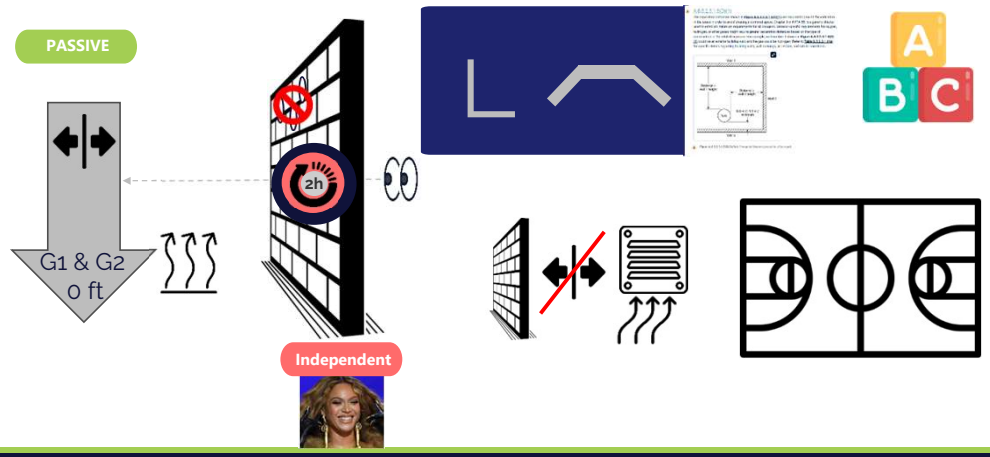
7.3.2.3 GH2 Bulk – Storage: Outdoor (Distance Reduction)



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7.3.2.3 GH2 Bulk – Storage: Outdoor (Distance Reduction)

Active

Mitigate Failures

Make **system failures** less bad

Mitigate Leaks

Make **system leaks** less bad

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7.3.2.5 GH2 Bulk – **Storage: Outdoor Courts**

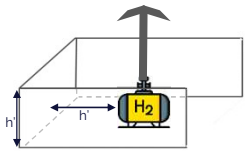


Table 7.3.2.3.1.2(B)(a)

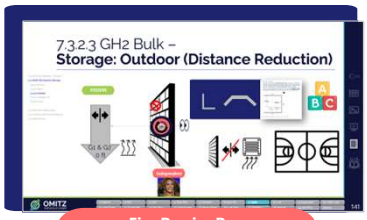
Table 7.3.2.3.1.2(B)(b)

Table 7.3.2.3.1.2(B)(c)

6.17: Vent Termination

6.18: Ventilation

6.10: Explosion Control



Fire Barrier Reqs

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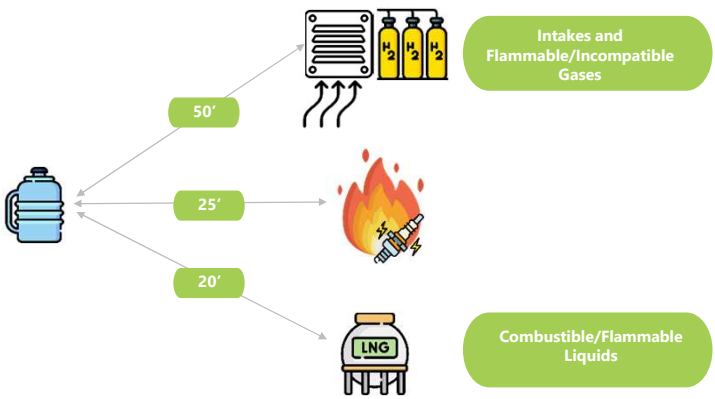
8.2.1 Non-Bulk LH2 – **Indoor Storage: Not Detached/Gas Rooms**



Intakes and Flammable/Incompatible Gases

Combustible/Flammable Liquids

Incompatible Materials

NFPA 70: 500 & 501

6.18: Ventilation

Protect from Damage

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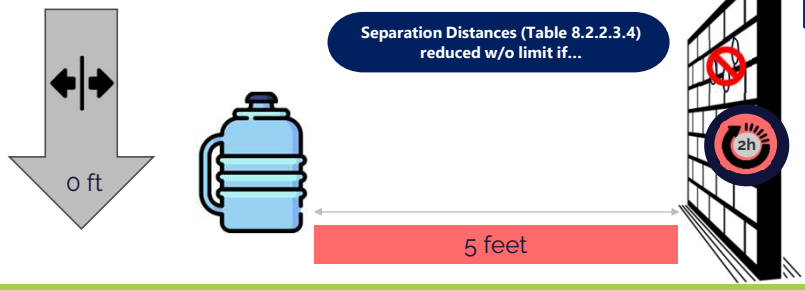
8.2.2 Non-Bulk – **Outdoor: Separation Distances**

Non-Reducible

- 25' - Building Openings OR Minimum Distance from Bulk Storage (lesser)
- 50' – Air Intakes OR Minimum Distance from Bulk Storage (lesser)

Separation Distances (Table 8.2.2.3.4) reduced w/o limit if...



Independent

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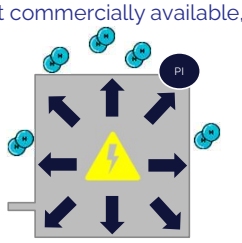
8.3.1.2.6-7 Bulk – **Electrical System | Bonding & Grounding**

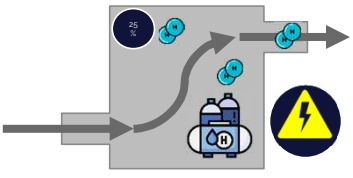
NFPA 70: 500 & 501

Grounding/Bonding

NFPA 496

- Class 1, Division 1, Group B (hydrogen) areas classification (Table 8.3.1.2.6.1)
- When not commercially available, purge/ventilate per **NFPA 496** or intrinsically safe





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8.3.2.3.1 Bulk LH2 Storage – **Outdoor: Aboveground Tanks**

Non-Combustible

Fenced Areas:

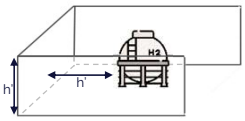
Prevent Unauthorized Entry | Two Egress

Enclosed Courts

Not allowed with LH2 Stationary Containers

Open Courts

Allowed, with restrictions:
- Distance per Table 8.3.2.3.1.6(a)
- **NFPA 55** (Ch 9, 11, 13, & 16)
- Separated by **1 x** Wall Height



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8.3.2.3.1 Bulk LH2 Storage **Outdoor (Aboveground):Siting Location**

Table 8.3.2.3.1.6(a)

Table 8.3.2.3.1.6(b)

Vacuum-Insulated? 2/3 Reduction

10 ft from Sewer Opening

Closest Part of System

Inside Diameter

Pressure

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Ch 12: HYDROGEN FUEL CELL POWER SYSTEMS

HYDROGEN TO GENERATE POWER

255

255

256

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12.1-2 H2 Fuel Cell Power Systems
Scope | General Requirements

DESIGN

CONSTRUCTION

INSTALL

Applicability
Stationary, portable, hydrogen vehicle, and micro fuel cell systems.

Equipment
Listed and approved (some equipment exempt). Ch 13 not required for processing equipment per NFPA 853.

Requirements

Use-Specific
Use specific requirements if they exist.

Installation
Per listing and manufacturer

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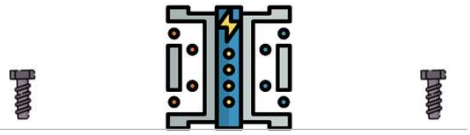
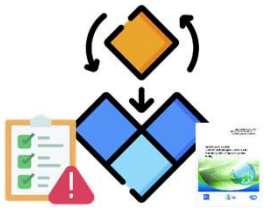
12.3 H2 Fuel Cell Power Systems
Specific Requirements: Stationary



Prepackaged



Matched Modular

Engineered

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12.3 H2 Fuel Cell Power Systems - **Specific Requirements: Portable**

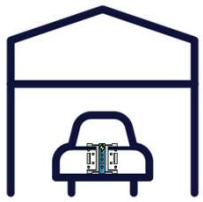
12.1 Scope
12.2 General
12.3 Specific Requirements
12.4 Storage

Portable Fuel Cell

ANSI/CSA America **FC3**: Designed, tested, and listed.

Micro-Fuel Cell

Listed or approved **for application**



H2 Vehicle Fuel Cell

Temporary power to dwellings

NFPA 70

OMITZ Authority on Insight

1 Admin | 2 Ref | 3 Def | 4 Gen Fire | 5 Perform | 6 Gen Hz | 7 GH2 | 8 LH2 | 9 Explosion | 10 Veh Fuel
11 LH2 Fuel | **12: Fuel Cell** | 13 H2 Gen | 14 Comb App | 15 Spec Apps | 16 Lab Ops | 17 Parking | 18 Repair | 19 H2 PITs | Annex

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Ch 13: HYDROGEN GENERATION SYSTEMS

REQUIREMENTS FOR MAKING HYDROGEN

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NFPA 2: Number of Words per Chapter
0
2000
4000
6000
8000
10000
12000
14000
Chapter 1
Chapter 2
Chapter 3
Chapter 4
Chapter 5
Chapter 6
Chapter 7
Chapter 8
Chapter 9
Chapter 10
Chapter 11
Chapter 12
Chapter 13
Chapter 14
Chapter 15
Chapter 16
Chapter 17
Chapter 18
Chapter 19
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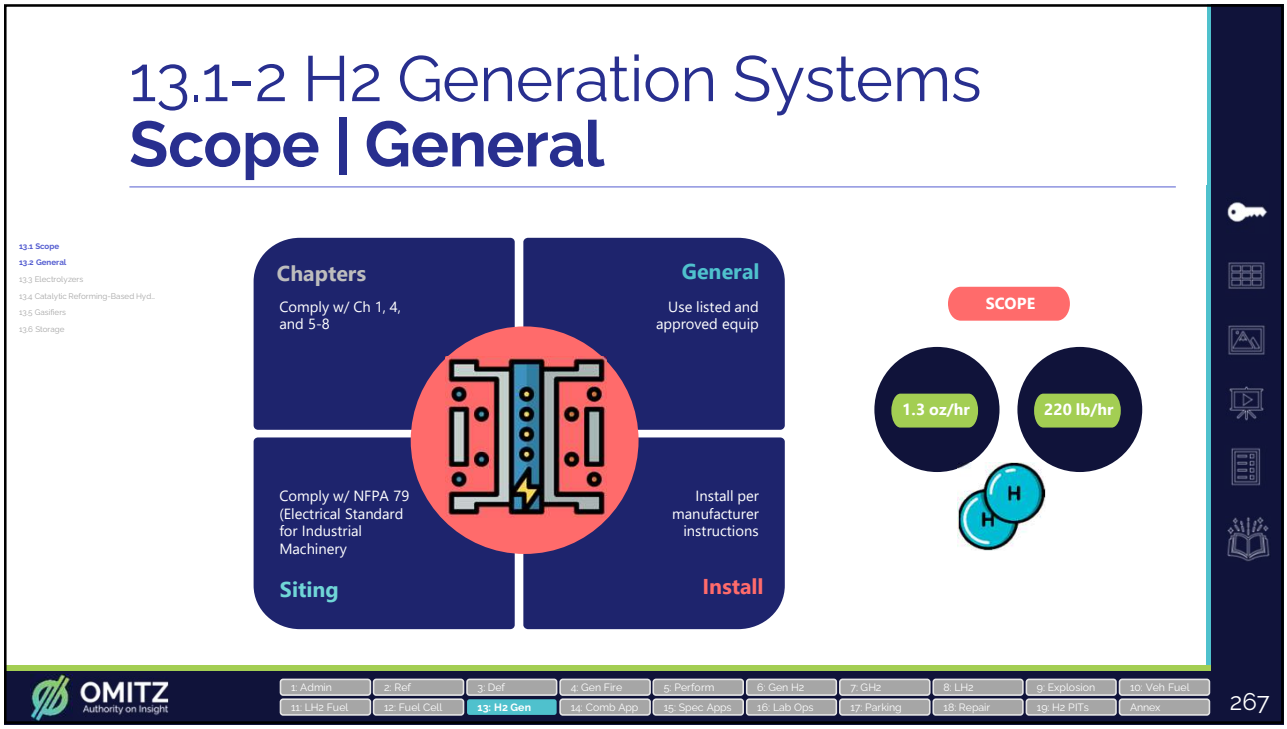
13.1-2 H2 Generation Systems
Scope | General
13.1 Scope
13.2 General
13.3 Electrolyzers
13.4 Catalytic Reforming-Based Hyd..
13.5 Gasifiers
13.6 Storage
Chapters
Comply w/ Ch 1, 4, and 5-8
General
Use listed and approved equip
Comply w/ NFPA 79 (Electrical Standard for Industrial Machinery
Siting
Install per manufacturer instructions
Install
SCOPE
1.3 oz/hr
220 lb/hr
H
H
OMITZ
Authority on Insight
1: Admin
2: Ref
3: Def
4: Gen Fire
5: Perform
6: Gen H2
7: GH2
8: LH2
9: Explosion
10: Veh Fuel
11: LH2 Fuel
12: Fuel Cell
13: H2 Gen
14: Comb App
15: Spec Apps
16: Lab Ops
17: Parking
18: Repair
19: H2 PITs
Annex
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13.2.3-5 H2 Generation Systems
General

	Indoor Installation	Outdoor Insallation
Nonbulk systems separated from exposure	✓	✓
< MAQ: No fire rated separation needed	✓	✓
Designed for outdoor installations	●	✓
Protect against weather and lightning	●	✓
Rooftop materials non-combustible/Class A w/in 12"	●	✓

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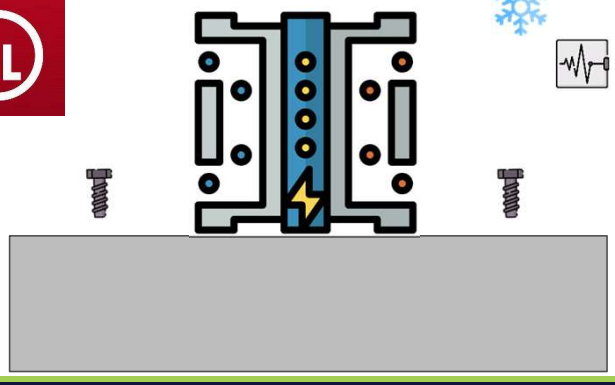
13.3 H2 Generation Systems
Electrolyzers



6.17: Vent Termination

NFPA 70: 500 & 501

6.18: Ventilation

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