NREL
NATIONAL RENEWABLE ENERGY LABORATORY

# Stationary and Portable Fuel Cell Systems Codes and Standards Citations

This document lists codes and standards typically used for Stationary and Portable Fuel Cell Systems projects. To determine which codes and standards apply to a specific project, you need to identify the codes and standards currently in effect within the jurisdiction where the project will be located. Some jurisdictions also have unique applicable ordinances or regulations.

Learn about codes and standards basics at www.afdc.energy.gov/afdc/codes_standards_basics.html.

Find Stationary and Portable Fuel Cell Systems codes and standards in these categories:



## Balance of Plant

### ANSI/CSA America FC 1-2004, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2012)

- 1.8.2 Metallic Piping
- 1.8.3 Flue Gas Venting Systems
- 1.11.2.1 Shut-off Valves
- 1.11.2.2 Supply Fuel Valves

### International Fire Code (International Code Council 2012)

- 5003.2.2 Piping, Tubing, Valves, and Fittings
- 5003.3 Release of Hazardous Materials
- 5303.3 Pressure Relief Devices
- 5303.4.3 Piping Systems
- 5303.6 Valve Protection
- 5305.3 Piping Systems

- 5305.4 Valves
- 5305.5 Venting

### International Fuel Gas Code (International Code Council 2012)

- 703.3 Pressure Relief Devices
- 704 Piping, Use and Handling

### International Mechanical Code (International Code Council 2012)

- 305 Piping Support
- 401 General
- 501 Exhaust Systems
- 502 Required Systems
- 510 Hazardous Exhaust Systems

### NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)

- 7.3.1.3 Piping Systems
- 7.3.1.4 Valves
- 10.2.3 Hydrogen-Venting Systems
- 10.2.3.1 Venting Requirements

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 6.4.1 Gaseous Hydrogen Storage
- 6.4.1 Ventilation Air
- 6.4.3 Hydrogen Piping
- 7.1.1 General
- 7.2.2 When Natural Ventilation Permitted
- 7.3 Exhaust Systems

## Compressed Hydrogen Gas Storage

### International Building Code (International Code Council 2012)

- 414.4 Hazardous Materials Systems

### International Fire Code (International Code Council 2012)

- 5003.2 Systems, Equipment, and Processes
- 5003.2.1 Design and Construction of Containers, Cylinders, and Tanks
- 5003.2.4 Installation of Tanks
- 5003.2.5 Empty Containers and Tanks

- 5003.4 Material Safety Data Sheets
- 5003.9.2 Security
- 5003.9.3 Protection from Vehicles
- 5003.9.9 Shelf Storage
- 5004 Storage
- 5303.1 Containers, Cylinders, and Tanks
- 5303.2 Design and Construction
- 5303.4.1 Stationary Compressed Gas Containers, Cylinders, and Tanks
- 5303.4.2 Portable Containers, Cylinders, and Tanks
- 5303.5 Security
- 5303.6.1 Compressed Gas Container, Cylinder, or Tank Protective Caps or Collars
- 5303.10 Unauthorized Use
- 5303.12 Leaks, Damage, or Corrosion
- 5303.13 Surface of Unprotected Storage or Use Areas
- 5303.14 Overhead Cover
- 5304 Storage of Compressed Gases
- 5305.1 Compressed Gas Systems
- 5803.1.2 Storage Containers
- 5803.1.3 Emergency Shutoff
- 5803.1.4 Ignition Source Control

**International Fuel Gas Code (International Code Council 2012)**

- 303 Appliance Location
- 409 Shutoff Valves
- 703.2 Containers, Cylinders, and Tanks
- 703.5 Security

**International Mechanical Code (International Code Council 2012)**

- 303 Equipment & Appliance Location

**NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2010)**

- 7.1.4 Listed and Approved Hydrogen Equipment
- 7.1.6 Containers, Cylinders and Tanks
- 10.3.2 Location of Gaseous Hydrogen Systems

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 6.4.1 Gaseous Hydrogen Storage
- 6.4.3.2 Hydrogen Piping
- 6.4.3.5 Hydrogen Piping
- 6.4.3.7 Hydrogen Piping
- 6.4.3 Hydrogen Piping
- 6.4.3.1 Hydrogen Piping

## Design

### ANSI/CSA America FC 1-2004, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2004)

- 1.2 Power Systems Design
- 1.3 Physical Environment and Operating Conditions
- 1.4 Selection of Materials
- 1.6 Cabinets

### International Building Code (International Code Council 2012)

- 307.1.1 Maximum Allowable Quantities
- 414.1 General
- 414.2 Control Areas
- 1609 Wind Loads
- 1612 Flood Loads
- 1808 Foundations

### International Fire Code (International Code Council 2009)

- 5003.1.1 Maximum Allowable Quantities per Control Area
- 5003.1.3 Quantities Not Exceeding the Maximum Allowable Quantity per Control Area
- 5003.1.4 Quantities Exceeding the Maximum Allowable Quantity per Control Area
- 5003.2.8 Seismic Protection
- 5003.8 Construction Requirements
- 5003.8.1 Buildings
- 5003.8.2 Required Detached Buildings
- 5003.8.3 Control Areas
- 5003.8.4 Gas Rooms

- 5003.8.5 Exhausted Enclosures
- 5003.8.6 Gas Cabinets
- 5003.8.7 Hazardous Materials Storage Cabinets
- 5003.1 Quantities Not Exceeding the Maximum Allowable Quantity per Control Area
- 5003.2 Quantities Exceeding the Maximum Allowable Quantity per Control Area
- 5004.2 Outdoor Storage

### International Fuel Gas Code (International Code Council 2012)

- 301 General
- 302 Structural Safety
- 633 Stationary Fuel Cell Power Systems
- 635 Gaseous Hydrogen Systems

### International Mechanical Code (International Code Council 2012)

- 301 General
- 302 Protection of Structure
- 924 Stationary Fuel Cell Power Systems
- 926 Gaseous Hydrogen Systems

### NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association, 2010)

- 7.1.4 Listed and Approved Hydrogen Equipment
- 10.2.2 Piping Systems

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 4.2 Prepackaged, Self-Contained Fuel Cell Power Systems
- 4.3 Pre-Engineered Fuel Cell Power Systems
- 4.4 Engineered and Field-Constructed Fuel Cell Power Systems
- 5.1.1 (2) General Siting
- 6.4.1 Gaseous Hydrogen Storage

## Electrical Equipment

### ANSI/CSA America FC 1-2004, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2004)

- 1.12 Electrical Safety

### International Fire Code (International Code Council, 2009)

- 5003.9.4 Electrical Wiring and Equipment

- 5003.9.5 Static Accumulation
- 5303.8 Wiring and Equipment
- 5803.1.5 Electrical

**International Fuel Gas Code (International Code Council 2012)**

- 703.4 Venting
- 703.6 Electrical Wiring and Equipment

**NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2007)**

- 8.1.3 Electrical Equipment and Components

## Equipment Safety

**ANSI/CSA America FC 1-2004, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2004)**

- 1.3.3 Physical Environmental
- 1.3.6 System Purging
- 1.3.7 Vibration, Shock and Bump
- 1.3.8 Handling, Transportation, and Storage
- 1.3.9 Protection against Fire and Explosion Hazards

**International Building Code (International Code Council 2012)**

- 414.6 Outdoor Storage, Dispensing, and Use

**International Fire Code (International Code Council 2012)**

- 5003.1 Hazardous Materials
- 5003.2.3 Equipment, Machinery, and Alarms
- 5003.2.9 Testing
- 5003.9 General Safety Precautions
- 5003.9.1 Personnel Training and Written Procedures
- 5003.9.8 Separations of Incompatible Materials
- 5003.12 Outdoor Control Areas
- 5005 Use, Dispensing, and Handling
- 5303.7 Separations from Hazards
- 5305 Use and Handling of Compressed Gases
- 5305.2 Controls
- 5305.6 Upright Use

- 5305.7 Transfer
- 5305.9 Material-Specific Regulations
- 5305.10 Handling
- 5805 General Use

### International Fuel Gas Code (International Code Council 2012)

- 705 Testing of Hydrogen Piping Systems
- 706 Location of Gaseous Hydrogen Systems

### NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)

- 7.1.11 Separation from Hazardous Conditions
- 7.6 Flammable Gases

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 5.1.1 General Siting
- 5.1.2 General Siting
- 5.2 Outdoor Installations
- 9.2 Outdoor Installations

## Fire Safety

### ANSI/CSA America FC 1-2004, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2012)

- 1.5 General Requirements
- 1.6 Cabinets
- 1.16 Marking, Labeling, and Packaging
- 1.16.2 FC Power System Marking
- 1.19.4.2 Installation Manual

### International Building Code (International Code Council 2012)

- 907 Fire Alarms and Detection Systems

### International Fire Code (International Code Council 2012)

- 401 General Emergency Planning and Preparedness
- 406 Employee Training and Response Procedures
- 5003.9.1.1 Fire Department Liaison
- 5303.4 Gas Marking
- 5303.11 Exposure to Fire

- 5303.16.13 Accessway
- 5503.4 Liquid Marking

**International Fuel Gas Code (International Code Council 2012)**

- 305 Installation

**International Mechanical Code (International Code Council 2012)**

- 304 Installation

**NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2010)**

- 7.1.8 Labeling Requirements
- 10.2.1 Marking
- 10.6.1.2 Fire Protection

**NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)**

- 5.1.3 General Siting
- 5.2 Outdoor Installations
- 6.1.2 General
- 8.1.2 Fuel Cell Fire Protection and Detection
- 9.2 Outdoor Installations
- 9.5 Fire Protection

## Fuel Lines

**ANSI/CSA America FC 1-2012, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2004)**

- 1.8.1 Metallic Piping

**NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)**

- 7.3.1.3 Piping Systems

**NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)**

- 6.4.1 Gaseous Hydrogen Storage
- 6.4.3 Hydrogen Piping

## Operation Approvals

### ANSI/CSA America FC 1-2012, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association, 2004)

- 1.16.1 Marking, Labeling and Packaging
- 1.16.2 FC Power System Marking
- 1.16.4.2 Installation Manual

### CGA P-1, Safe Handling of Compressed Gases in Containers (Compressed Gas Association 2008)

- 4.4 Regulating Authorities of Employee Safety and Health

### International Fire Code (International Code Council 2012)

- 105.6.8 Compressed Gases
- 404.3.2 Fire Safety Plans
- 406 Employee Training and Response Procedures
- 5003.5 Hazard Identification Signs
- 5003.6 Signs

### NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)

- 4.7 Personnel Training
- 4.8 Fire Department Liaison
- 7.1.8 Labeling Requirements
- 10.2.1 Marking
- 10.3.2 Location of Gaseous Hydrogen Systems
- 10.6.1.2 Fire Protection

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 6.1.2 General
- 6.4.1 Gaseous Hydrogen Storage
- 6.4.3 Hydrogen Piping
- 8.2 Fire Prevention and Emergency Planning

## Periodic Inspections

### ANSI/CSA America FC 1-2012, Stationary Fuel Cell Power Systems (American National Standards Institute and Canadian Standards Association 2004)

- 1.16.4.5 Maintenance Manual

### International Fire Code (International Code Council 2012)

- 5003.2.6 Maintenance
- 5303.9 Service and Repair

### International Fuel Gas Code (International Code Council 2012)

- 707 Operation and Maintenance of Gaseous Hydrogen Systems

## Setbacks and Footprints

### International Fire Code (International Code Council 2012)

- 5003.9.8 Separations of Incompatible Materials
- 5003.7 Separations from Hazards
- 5004 Storage of Compressed Gases

### International Fuel Gas Code (International Code Council 2012)

- 706 Location of Gaseous Hydrogen Systems

### NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)

- 10.3.2 Locations

### NFPA 853, Standard for the Installation of Stationary Fuel Cell Power Systems (National Fire Protection Association 2010)

- 6.4.1 Gaseous Hydrogen Storage

## Transportation

### CGA P-1, Safe Handling of Compressed Gases in Containers (Compressed Gas Association 2008)

- 4.1 Transportation Regulating Authorities
- 4.2 Container Regulations
- 4.3 Container Filling Regulations
- 6.2 Flammable Gases

### International Fire Code (International Code Council 2012)

- 105.6.8 Compressed Gases
- 404.3.2 Fire Safety Plans
- 5005 Use, Dispensing, and Handling
- 5305.7 Transfer
- 5805 General Use

**NFPA 55, Compressed Gases and Cryogenic Fluids Code (National Fire Protection Association 2013)**

- 7.3 Use and Handling
- 8.3.5 Overfilling
- 10.3.2 Location of Gaseous Hydrogen Systems

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