Ford Fuel Cell Vehicle Demonstration Programs

Emergency Responder Guide - Ford Focus FCV

What is a Fuel Cell Vehicle?

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Emergency Response
Hydrogen Fuel Cell Vehicles
Hydrogen

FCV Emergency Response
Hydrogen Fuel Cell Vehicles
Hydrogen

Topics Covered

Purpose

Accident procedures in the event of a Fuel Cell Vehicle incident and address recommended response.

These materials provide first responders an understanding of hydrogen and fuel cell technology.
Basic Characteristics of Hydrogen

Hydrogen has a higher auto-ignition temperature than gasoline.

Hydrogen will disperse more rapidly than gasoline vapors and will rise more quickly away than gasoline vapors.

Hydrogen is lighter than air and will rise more quickly away than gasoline vapors.

Hydrogen can ignite at lower concentration in air than gasoline.

Hydrogen Compared to Gasoline Vapors

Features of Hydrogen

- Lower pressure in fuel lines
- Hydrogen storage
- Standard automobile battery
- Low voltage (12 volt) source
- Ni-MH batteries
- Fuel cell
- Regenerative braking
- Electrical drive motor
- Fuel cell and battery electric hybrid

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Add Ballard Video

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Compressed H₂ Storage Tank in the Ford Focus FCV

Hydrogen Safety

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Testing of Compressed H₂ Storage Tanks

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Fuel Leak Simulation (2001) –
Michigan State University of Miami

Time: 5 seconds

Pressurization Relief Device (PRD)

The result of venting through the

Time: 5 seconds

The hydrogen fire is shown as
**Emergency FCV**

**PROCEDURE**

1. Rescue
2. Notify
3. Identify
4. Isolate
5. Think

**Vehicle Safety Systems**

- **Compressed Hydrogen:**
  - Identify the vehicle and its location.
  - Lowest hydrogen storage at 8 lines.
  - However, always assume the vehicle is powered.

- **Hydrogen Storage:**
  - Vehicle is equipped with an internal switch to automatically disconnect high voltage and shut off hydrogen flow in case of an accident.

- **Pressurized Relief Device (PRD):**
  - Detect vehicle impact, RGB, and impact sensors.
  - Detect hydrogen leakage (no leak when vehicle systems are hydrogen sensors).
Keep people away from the scene.

Identify Critical Areas

Identity

Refer to MSDS.

Public Safety / First

Identify hazard & effects on:

1. "Hydrogen Fuel Cell" on trunk
2. "Hydrogen" on trunk lid
3. Blue diamond "compressed" cell
4. "Hydrogen" on door

Vehicle graphics indicating Fuel Cell

Isolate the Area

Assemble Safety Gear per E.R. Guide 115

Initial perimeter recommended 150 meters

Source: National Transportation Council

Assess the direction of initial fire on the scene.

If "hydrogen" is suspected, keep at least 500 feet from the leak.

Vehicle Body side graphics & vehicle underbody graphics

Add FC Vehicle

Hydrogen Fuel Cell Rear Hatch and Compressed Hydrogen Cell on the deck lid

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Identity Critical Areas

Keep clear of H2 PRD vent location (trunk lid) before beginning any operation around the vehicle (see ER sheets).

See shutdown procedure and reference diagrams on next three slides.

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Rescue

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Detection.
- Front mounted H2 sensor
- Leaking sound sensor
- Electrochemical sensor
- Combustion sensor
- Thermal conductivity
- H2 leak detection
- Long handle wrench
- UV/IR detection
- H2 fire detection

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Accident! Always Assume the Vehicle is Powered!

Disconnect high voltage and shut off vehicle only in case of an emergency system is locally activated with an internal switch to automatically.

Notify Responsible Agencies

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Rescue Summary

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THANK YOU!