

Hydrogen Powered Internal Combustion Engine (HPICE) Basics

eLearning courses designed to increase productivity and profits

Learning Made Simple, Visual, and Interactive

The THORS *Hydrogen Powered Internal Combustion Engine (HPICE) Basics* course introduces the learner to HPICE components and ignition system along with the hydrogen manufacturing processes, storage, transportation, and delivery. This course also provides interactive learning of the HPICE operating parameters, operational challenges, and emission control strategies.

Credit Hours **2**

Learning Objectives

- 💡 Define the components specific to a Hydrogen Powered Internal Combustion Engine (HPICE).
- 💡 Identify the properties of hydrogen that make it a fuel fit element.
- 💡 Understand the different methods of manufacturing, storing, and transporting hydrogen fuels.
- 💡 Outline the various operating parameters involved in HPICE operation.
- 💡 Explain the emission contributors and their control strategies.

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I. HPICE Dynamics

- **Engine Considerations**
 - ▣ HPICE Components
 - ▣ HPICE Ignition System
- **Fuel Considerations**
 - ▣ Hydrogen Properties
 - ▣ Hydrogen Manufacturing
 - Steam Reforming
 - Electrolysis
 - ▣ Hydrogen Storage
 - ▣ Hydrogen Transportation

I. HPICE Dynamics (continued)

- Pipelines
- Tube Trailers
- Insulated Vessels and Tankers
- ▣ **Hydrogen Delivery**

II. HPICE Operation

- **Operating Parameters**
 - ▣ Flammability
 - ▣ Energy Density
 - Gravimetric Energy Density

II. HPICE Operation (continued)

- Volumetric Energy Density
- ▣ Quenching Distance
- ▣ Diffusivity
- ▣ Stoichiometric Ratio
- **Operational Challenges**
- **Emission Control**
 - ▣ Emission Contributors
 - ▣ Emission Control Strategies
 - Pre-Intake Control Strategies
 - In-Cylinder Control Strategies
 - Post-Combustion Control Strategies

