Agenda

**Presented by Don Steeby**

**Air-Source Heat Pump Science and Technology**
- Understanding the refrigeration cycle
- Principles of heat transfer
- How comfort is measured
- Understanding efficiency

**Air-Source Heat Pump Efficiency, Economics and Operations**
- Components and operation of heat pumps: air-source, water-source and ground-source
- Heating operation in subfreezing conditions
- Integrating heat pumps with existing heating systems

**System Sizing and Components**
- Making heat loss calculations
- Sizing and locating of exterior and interior units
- Duct systems
- Refrigerant lines
- Wiring and controls

**Mini-Split Systems**
- How mini-splits differ from ducted systems
- Applications for mini-split systems
- Sizing and locating exterior and interior units

**Integrating Heat Pumps with Other Energy-Efficiency Measures**
- Heat pump economics
- Measuring performance
- Calculating savings and cost
- Integrating heat pumps with other HVAC systems

**Heat Pump Case Studies**
- New construction
- Existing buildings

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**Learning Objectives**

You’ll be able to:

**Describe** heat transfer principles, the refrigeration cycle, indoor air comfort, and HVAC energy efficiency.

**Distinguish** air-source heat pumps from other types of heat pumps, and discuss heat pump performance in sub-freezing conditions.

**Integrate** heat pumps with existing heating systems.

**Use** heat loss calculations to size air-source heat pumps.

**Differentiate** mini-split systems from ducted systems and explore applications for mini-splits.

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Learn about air-source heat pump science and technology
Explore air-source heat pump efficiency, economics and operations
Discuss sizing and locating of exterior and interior units
Examine how mini-split systems differ from ducted systems
Integrate heat pumps with other energy-efficiency measures
Review heat pump case studies

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**Continuing Education Credits**

Professional Engineers
7.0 Continuing Ed. Hours

Architects
7.0 HSW Continuing Ed. Hours
7.0 AIA LU/HSW

International Code Council
7 CEUs (Energy)

Contractors
Non-Credit Continuing Ed.

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Air-Source Heat Pumps for Energy Efficiency
Grand Rapids, MI - Wednesday, April 8, 2020

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Seminar Information

Don Steeby Professor at Grand Rapids Community College
Mr. Steeby is a professor of Heat, Air Conditioning and Refrigeration at Grand Rapids Community College. He has taught full time with GRCC since 2007. He has also taught as an adjunct professor for Ferris State University in Construction Management. He received his bachelor of science degree in HVAC/R Applied Technology from Ferris State University, and his master's degree in Career and Technical Education also from Ferris State University.

Mr. Steeby has worked in the HVAC field since 1985. He has held positions in many areas of the industry including installation, service, sales, and project management. Mr. Steeby has worked for a local manufacturer of HVAC equipment for over five years, and he was employed by Honeywell for 11 years. He holds a mechanical contractor's license with the State of Michigan, and he has several nationally-recognized certifications including installation and service of geothermal equipment with North American Technician Excellence (NATE). He is also a certified installer and installer of geothermal heat pumps through the International Ground Source Heat Pump Association (IGSHPA). Mr. Steeby has been actively involved in the geothermal industry for many years including writing software to size loop links and working on several commercial geothermal installations. In 2011, he published his book Alternative Energy – Sources and Systems through Cengage Learning which includes chapters on geothermal systems.

Continuing Education Credit Information
This seminar is open to the public and offers 7.0 continuing education hours to professional engineers and 7.0 HSW continuing education hours to architects in all states. Educators and courses are not subject to pre-approval in Michigan.

This course has been approved by the American Institute of Architects Continuing Education System for 7.0 LU|HSW (Provider No. 1856205861). Visit www.halfmoonseminars.org to view complete AIA/CES information under this course listing. Only full attendance is reportable to the AIA/CES. HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Indiana (License No. CE21700059), Maryland, New Jersey (Approval No. 54720-0270), North Carolina, and North Dakota. HalfMoon Education is an approved continuing education sponsor for new York engineers and architects.

The International Code Council has approved this event for 7 CEUs in the specialty area of Energy (Preferred Provider No. 1252)

Additional Learning

Webinar Series
Foundation Damage and Repair
• Design & Geo-Environmental Loading, Building Codes, Soil Properties
• Foundation-Slab-Wall Design and Construction
• Evaluation of Foundation-Slab Damage and Repair Alternatives
• Evaluation of Foundation Wall Damage and Repair Alternatives

Solar Photovoltaic Project Design and Development
• Solar Photovoltaic Project Design and Development, Part I
• Solar Photovoltaic Project Design and Development, Part II

International Residential Code
• Development and Enforcement of International Residential Code
• IRC Building Planning and Shell Construction, Part I
• IRC Building Planning and Shell Construction, Part II
• IRC Energy Efficiency and Building Systems

Evaluation of Foundation-Wall Damage and Repair Alternatives
Thurs., March 5, 2020, 1:00 - 2:30 PM CST

Syllabus:

Foundation Damage and Repair

Special topics of common interest to professional engineers and architects involved in the design, installation, and repair of foundation systems and related building systems.

Requirements:

• Design & Geo-Environmental Loading

Foundation-Slab-Wall Design and Construction

Special topics of common interest to professional engineers and architects involved in the design, installation, and repair of foundation systems and related building systems.

Requirements:

• Foundation-Slab-Wall Design and Construction

Evaluating Building Codes, Soil Properties

Special topics of common interest to professional engineers and architects involved in the design, installation, and repair of foundation systems and related building systems.

Requirements:

• Building Codes, Soil Properties

Foundation-Wall Damage and Repair Alternatives

Special topics of common interest to professional engineers and architects involved in the design, installation, and repair of foundation systems and related building systems.

Requirements:

• Foundation-Wall Damage and Repair Alternatives

Registration
Air-Source Heat Pumps for Energy Efficiency
Grand Rapids, MI - Wednesday, April 8, 2020

Tuition
$279.00 Single Registrant
$299.00 Three or more registrants from the same company registering at the same time

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( ) I am attending. Please send me the self-study package:
Downloadable MP3 Audio/PDF Manual for $279.00
USB/Manual Package for $299.00
(SHR included. Please allow five weeks from seminar date for delivery)

Check the box below to indicate you have reviewed the credit hour requirements and have planned for the necessary study time. You must complete the entire course within the five day period. Check this box to indicate you have reviewed the credit hour requirements and have planned for the necessary study time. You must complete the entire course within the five day period.

( ) I need special accommodations. Please contact me.

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Name: Company/Firm:
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Email: Phone:
Occupation:

How to Register
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Complete the entire form. Attach duplicate if necessary.