

# Geothermal Heat Pump Systems

IGSHPA ACCREDITED INSTALLER TRAINING

**3-Day Course**

June 23 - 25, 2009

## **PROFESSIONAL** DEVELOPMENT

- ..... Geothermal System Installers
- ..... Mechanical Contractors
- ..... Equipment Suppliers
- ..... System Designers and Engineers
- ..... Well Drillers and Excavation Contractors

## **SPONSORED BY:**

Iowa Energy Center

Iowa Heat Pump Association



# GEOTHERMAL HEAT PUMP SYSTEM ACCREDITATION

## ••••• The Class

This intensive and practical three-day course will prepare you to design and install geothermal heat pump systems for residential and light commercial projects. Not only that, you will be able to qualify for accreditation to become an International Ground Source Heat Pump Association (IGSHPA) installer.

Participants will gain hands-on experience using real geothermal heat pump equipment and piping loops. The course is taught by an instructor affiliated with the IGSHPA. Each participant will receive a full set of IGSHPA training and reference materials.

## ••••• Who Should Attend?

Many project owners are requiring that geothermal system installers be accredited and knowledgeable. This course will provide the opportunity for accreditation of installers. It will also benefit other technical personnel that are involved with the design, installation, and operation of geothermal heat pump systems, including mechanical contractors, equipment suppliers, system designers and engineers, well drillers and excavation contractors, and utility company representatives.

## ••••• Course Highlights

Intensive three-day training course. Topics include introduction and overview, economics, soils identification, sizing and designing the system, designing the ground heat exchanger, pipe joining methods, installation, grouting procedures, flushing and purging, and startup and checkout.

Course includes hands-on fusion training for socket and butt fusion. Fusion cards will be issued for contractors to meet commercial requirements.

IGSHPA materials, including Installation Guide, Introductory Guide, Slinky Installation Guide, Design and Installation Standards, Grouting Procedures, Grouting for Vertical GHP Systems, and Soil and Rock Classification Field Manual (a value of over \$280).

A review and update of Iowa regulations and requirements for the installation of geothermal heat pump systems.

## ••••• Installer Accreditation and CEUs

Attendees will have the opportunity to take the Accreditation Examination to become an IGSHPA-accredited installer and have a one-year IGSHPA membership.

The optional Accreditation Examination will have three sections: IGSHPA accreditation; butt joint fusion; and socket joint fusion. Each section will be conducted open-book. Participants must score at least 90% on the written accreditation exam to become an IGSHPA-accredited installer.

Continuing Education Credits: Certified Well Contractors eligible for 10 hours credit and Professional Engineers eligible for 16 professional development hours.

## ••••• About the Instructor

Charles Remund, PhD., teaches Mechanical Engineering and serves as Program Coordinator for the Northern Geothermal Support Center at South Dakota State University in Brookings, SD. Dr. Remund has been principal investigator on many research projects associated with ground source heat pumps, specifically addressing heat transfer characteristics of grouting materials, soil, and rock. He has worked with regional electric utilities and the Geothermal Heat Pump Consortium. The Northern Geothermal Support Center has trained over 500 people in ground source heat pump design and installation.

## ••••• The Iowa Heat Pump Association

The Iowa Heat Pump Association (IHPA) is a nonprofit organization consisting of industry leaders and authorities on ground and air source heat pumps. The primary goal of the IHPA is to promote and ensure quality heat pump installations. If you are attending the workshop, you may join the IHPA through a special introductory offer for new members. The IHPA's Web site is: [www.iaheatpump.org](http://www.iaheatpump.org).

## ••••• The Iowa Energy Center

The Iowa Energy Center is a research, demonstration and education organization dedicated to improving Iowa's energy efficiency and use of renewable energy. The Energy Center has established a number of programs to address energy-related issues and their associated economic and environmental benefits.

The Energy Center's Energy Resource Station (ERS) is a research and training facility equipped to simultaneously test and demonstrates multiple, full-scale commercial building HVAC systems. Work done at the ERS helps the Energy Center provide practical information on cost-effective, energy-efficient technologies for commercial and industrial buildings. At the ERS, hands-on training for energy professionals is another benefit the Energy Center provides Iowans.

## Course Schedule

Course check in will be at 7:45 a.m. on Tuesday, June 23, at the Iowa Energy Center's Energy Resource Station in Ankeny. The sessions will begin at 8 a.m. and finish at 4:30 p.m. The optional Accreditation Examination will be held at 2:30 p.m. on Thursday, June 25. The instructor will be available for additional assistance during free time after the class sessions.

## Course Outline

### Introduction and Overview

- Geothermal systems concept
- Basic heat pump system
- Domestic hot water options
- System material and components
- Who's involved in geothermal system technology

### Economics, Marketing and Demand Reduction

- Benefits to homeowner
- Benefits to contractor
- Benefits to utility
- Benefits from demand hot water heat pump

### Soils Identification

- Properties of soils
- Field identification procedures
- Rock classification according to thermal conductivity
- Definition of Petrologic Groups
- Thermal conductivity values for rocks

### Selecting, Sizing and Designing the Heat Pump System

- Design procedure for the heat pump system
- Determining building heating and cooling loads
- Performance of an air-source heat pump
- Performance of a ground-source heat pump
- Ground load calculations
- Equipment selection
- Air distribution system
- Duct layout

### Designing the Ground Heat Exchanger

- Steps in ground heat exchanger design
- Ground heat exchanger configuration
- Standardized parallel system header design
- Selection of ground heat exchanger circulating fluid
- Plastic pipe selection
- Ground heat exchanger sizing and design procedure
- Selecting the circulating pump

### Grouting Procedures for Ground-Source Heat Pump Systems

- Importance of well grouting
- Ineffective grouting practices
- Grouting materials
- Grout placement methods
- Grout pumps
- Grout mixing

### Pipe Joining Methods

#### (with hands-on activity and fusion certification)

- Heat fusion and methods – overview
- Butt fusion procedures
- Sidewall fusion joining
- Socket fusion procedures

### Installation of the Ground Heat Exchanger

- Site plan
- Installation equipment
- Trenching and drilling costs
- Pipe installation considerations
- Headering up

### Flushing and Purging the System

- Flushing debris
- Air purging
- Verifying earth coil pressure/flow design
- Charging the system with antifreeze solution
- Pressurizing the closed-loop system

### Heat Pump System Startup and Checkout

- Heating performance check
- Cooling performance check

### Accessories

- Desuperheaters for domestic hot water heating
- Desuperheater design and selection
- Resistance heat

### Regulations and Requirements

- Iowa Department of Natural Resources Regulations
- Water Well Permit Requirements
- Building Codes

### Accreditation Test

- IGSHPA Accreditation Test- Open Book (Allowed Two Hours)
- Butt Fusion Accreditation Test- Open Book (Optional)
- Socket Fusion Accreditation Test – Open Book (Optional)

### Course Wrap-Up and Adjourn

## Geothermal Heat Pump Systems Installation Accreditation

JUNE 23 - 25, 2009  
IOWA ENERGY CENTER,  
ENERGY RESOURCE STATION, ANKENY, IA

Registration is required as there are a limited number of spaces available for the course. To register, complete the form below and return with your credit card information or check made payable to:

Iowa Energy Center – Energy Resource Station,  
DMACC Building 23, 2006 S. Ankeny Blvd., Ankeny, IA 50023  
(515) 965-7055 Fax: (515) 965-7056

### ..... Participant Information

Name \_\_\_\_\_

Company/Affiliation \_\_\_\_\_

Job Title \_\_\_\_\_

Day Phone \_\_\_\_\_ Fax \_\_\_\_\_

Email \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip Code \_\_\_\_\_

### ..... Registration Fees

The fee includes all instructional materials and handbooks, and covers continental breakfast, refreshments, and lunch each day of the course.

Course Registration – \$470 each person: \_\_\_\_\_

Optional –  
IGSHPA Accreditation Examination, Registration and  
First-year IGSHPA membership – \$180 each person: \_\_\_\_\_

Iowa Heat Pump Association  
First-year membership special - \$150 each person: \_\_\_\_\_

### ..... Further Information

This course will be held at the Iowa Energy Center's Energy Resource Station located in Building 23 on the campus of the Des Moines Area Community College, 2006 South Ankeny Blvd., Ankeny, IA.

A campus map and parking information is available online: [www.energy.iastate.edu](http://www.energy.iastate.edu).

### ..... Change in Plans

If you cancel your registration before June 9, 2009, your full registration fee will be refunded less a \$25 processing fee. No refunds will be made on or after June 9, 2009. If you cannot attend the training you may send a substitute. We reserve the right to cancel this training due to insufficient registration.

### ..... Method of Payment

Check (payable to Iowa Energy Center)

Discover     Mastercard     Visa

Purchase Order P.O. Number

Cardholder Name \_\_\_\_\_

Signature \_\_\_\_\_

Card Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

Total Amount: \_\_\_\_\_  
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The Iowa Energy Center does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of the Iowa Energy Center, (515) 294-8819. The Iowa Energy Center is administered by Iowa State University.