

Ground Source Heat Pump Installation, Troubleshooting and Repair Technician

Course Outline

30 Hours: 15 Classroom/15 Lab Activities

- **Introduction to Ground Source Heat Pumps (2 hours, classroom)**
 - The Case for GSHP
 - GSHP Concept
 - Brief History
 - Operation
 - Materials
 - Components
 - Domestic Hot Water
- **Performance of GSHP (1 hour, classroom)**
 - Advantages of GSHP energy efficiency
 - Desuperheaters
- **Description of Ground Source Heat Exchanger (GSHEX) (1 hour classroom)**
 - Designing the GSHEX
 - Open loop wells
 - Closed loop vertical wells
 - Closed loop horizontal
 - Slinky
 - Pond
 - Soil considerations
 - Rocks
 - Ground Load Calculations
 - Test Wells
- **Pipe Types and Uses (3 hours, classroom/lab observation)**
 - Thermal Resistance
 - Pressure Ratings
 - Head Loss
 - Flow Capacities
 - Flushing Flow Rates
- **Selecting the GSHP Equipment (1 hour, classroom)**
 - Unitary Systems
 - Split Systems
 - Water to Air
 - Water to Air Split Type (Remote Condensing Unit)
 - Water to Water
 - Small Commercial System

- Multiple Load Systems
- Desuperheaters
- **Installation (3 hours, classroom/lab observation)**
 - Site evaluation
 - Site Plan
 - Installation Equipment
 - Pipe installation
 - Grouting materials
 - Grouting installation
 - Header/Manifold
 - Tie-In to GSHP
 - Desuperheater tie in
 - Restoration
- **Polyethylene Pipe Fusion (6 hours, classroom/lab activities, certification)**
 - Pipe
 - Fittings
 - Fusion Methods
 - Sidewall fusion
 - Socket fusion
 - Butt fusion
 - Fusion equipment
 - Demonstration and hands-on practice, butt and socket fusion
- **Commissioning (6 hours, classroom and lab activities)**
 - System Flushing and Purging
 - Antifreeze solutions
 - Calculating system volume
 - Calculating antifreeze quantity
 - Adding antifreeze
 - Pressurizing the system
 - Pressure and flow verification
 - Troubleshooting
 - System Pre-Startup
- **Startup Procedures (1 hour, classroom and lab activities)**
 - Performance check
 - Servicing
- **Troubleshooting (6 hours, classroom and lab activities)**
 - Water side
 - Refrigerant Side
 - Air Side

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