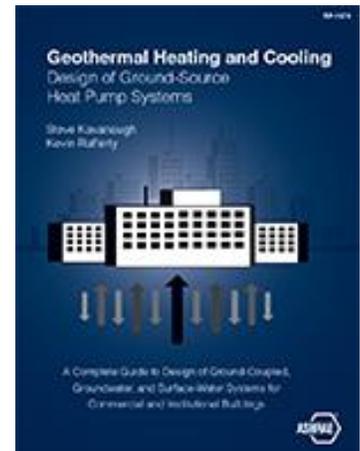


Geothermal Heat Pump Technical Session and Design Seminar

Design engineers, building owners and occupants have experienced a wide variety of energy consumption and satisfaction levels with geothermal heat pumps (a.k.a ground source heat pumps) in commercial and institutional buildings. A GHP seminar with an introductory technical session has been developed to demonstrate characteristics and design methods for successful applications. Design and installation procedures address the optimization of system efficiency, comfort, and installation cost. A method for evaluating design options will be introduced along with supplemental spreadsheet software. Much of the introductory information was generated from the results of field tests of over 40 GHP systems that have operating for three to 25 years. The introductory technical session can be presented at a monthly professional society meeting followed by four to six hour design seminar or included with the full seminar.



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The reference material for technical session and design seminar is the newly revised ASHRAE text, *Geothermal Heating and Cooling: Design of Ground Source Heat Pumps*, which was co-authored by seminar presenter Dr. Steve Kavanaugh. The new text takes advantage of the many lessons learned since the original GHP book was published (1997) and GHPs were primarily residential applications. Information was gathered from ASHRAE and GHP industry research and development projects, measured data from long term installations, and optimized installation practices used by high production GHP contractors. Seven of the original eight chapters and appendices were completely rewritten and additional information on site characterization has been added including a new hydro-geological chapter. The final chapter was replaced and contains results of recent field studies, energy and demand characteristics, and updated information to optimize GHP system cost. Supplemental software for a variety of GHP calculations also accompanies the text and will be demonstrated during the seminar. Purchase of the text is not required. Handout slides will be provided.

The design seminar topics are listed below and can be tailored for a four or full day seminar. It is suggested that in addition to the technical session the four-hour seminar include topics 2 (Equipment for GHPs), 4 (Applied GHP System Design), 7 (Piping and Pumps), 8 (Performance and Cost), a break and one work session with the free supplemental software. Options for longer seminars include topics 3 (Fundamentals of Vertical GHE Design), 6 (Surface Water Heat Pumps), and work sessions.

The seminar topics and schedule are:

1. Introduction to GHPs: Successes & Fiascos, Designs that Lead to Both (60 minutes)
2. Equipment for Geothermal Heat Pump Applications (45 minutes)
3. Optional - Fundamentals of Vertical Ground Heat Exchanger Design (20 minutes)
4. Applied Closed-Loop GHP System Design (60 minutes)
5. Break(s) (15 minutes – one for half day seminar, 2 for full day seminar)
6. Optional - Surface Water Heat Pumps (45 to 60 minutes)
7. Piping and Pumps for Closed-Loop Systems (60 minutes)
8. GHP Performance and Installation Cost (45 to 60 minutes)
9. Optional - Work Sessions (1 to 3 @ 20 minutes each)

Seminar pricing, additional details, and a listing of the previous seminars are available upon request (skavanaugh@eng.ua.edu). The book *Geothermal Heating and Cooling* can be previewed at <http://www.techstreet.com/ashrae/products/1887017>.