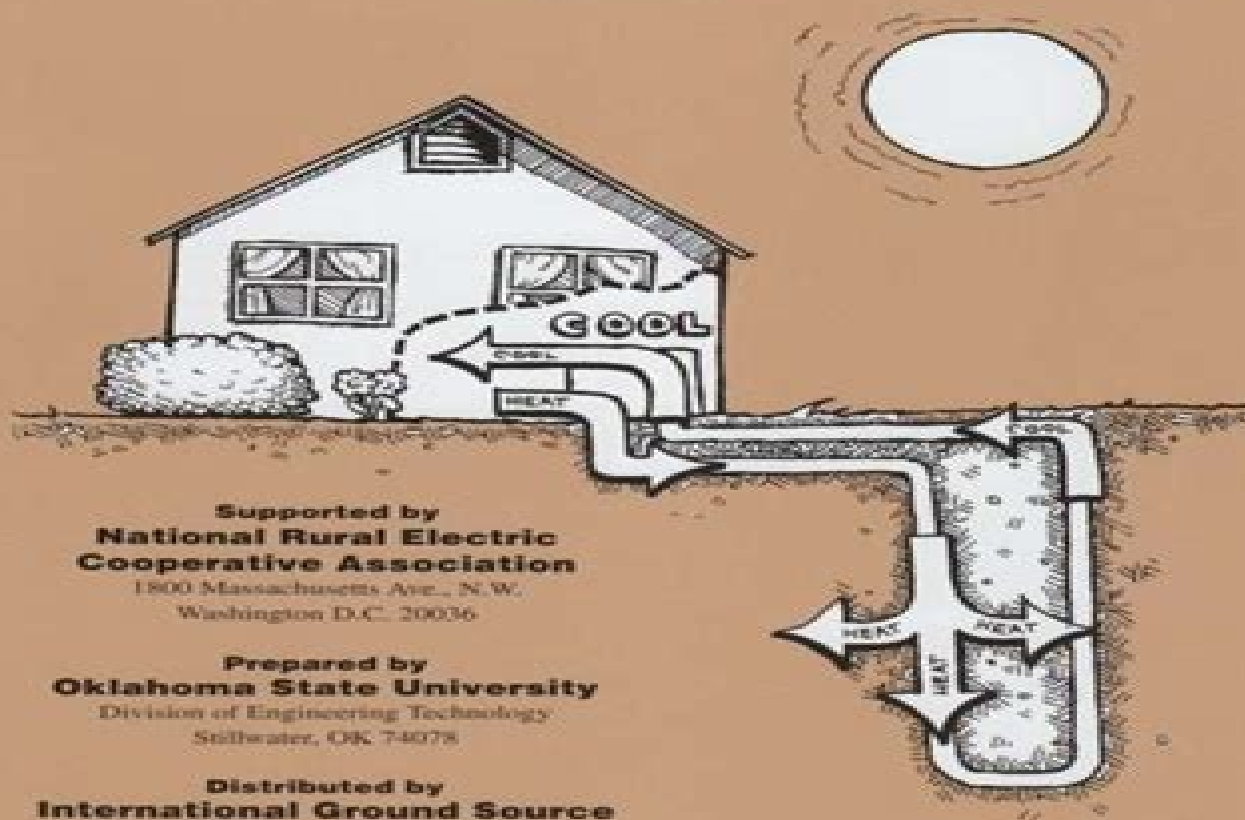


Closed-Loop/Ground-Source Heat Pump Systems

Installation Guide

NRECA Research Project 86-1



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Closed Loopground Source Heat Pump Systems Installation Guide

Stephen K. Ewings



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Closed-loop/ground-source Heat Pump Systems ,1988 **Geothermal Heat Pumps: Installation Guide** Stephen K. Ewings,2008-10 **Residential Ground Source Heat Pump Design Guide** ,1993 Commercial Ground Source Heat Pump Design Guide ,1993 **Advances in Ground-Source Heat Pump Systems** Simon Rees,2016-05-13

Advances in Ground Source Heat Pump Systems relates the latest information on source heat pumps GSHPs the types of heating and or cooling systems that transfer heat from or to the ground or less commonly a body of water As one of the fastest growing renewable energy technologies they are amongst the most energy efficient systems for space heating cooling and hot water production with significant potential for a reduction in building carbon emissions The book provides an authoritative overview of developments in closed loop GSHP systems surface water open loop systems and related thermal energy storage systems addressing the different technologies and component methods of analysis and optimization among other subjects Chapters on building integration and hybrid systems complete the volume Provides the geological aspects and building integration covered together in one convenient volume Includes chapters on hybrid systems Presents carefully selected chapters that cover areas in which there is significant ongoing research Addresses geothermal heat pumps in both heating and cooling modes

Handbook of Clean Energy Systems, 6 Volume Set Jinyue Yan,2015-06-22 The Handbook of Clean Energy Systems brings together an international team of experts to present a comprehensive overview of the latest research developments and practical applications throughout all areas of clean energy systems Consolidating information which is currently scattered across a wide variety of literature sources the handbook covers a broad range of topics in this interdisciplinary research field including both fossil and renewable energy systems The development of intelligent energy systems for efficient energy processes and mitigation technologies for the reduction of environmental pollutants is explored in depth and environmental social and economic impacts are also addressed Topics covered include

Volume 1 Renewable Energy Biomass resources and biofuel production Bioenergy Utilization Solar Energy Wind Energy Geothermal Energy Tidal Energy Volume 2 Clean Energy Conversion Technologies Steam Vapor Power Generation Gas Turbines Power Generation Reciprocating Engines Fuel Cells Cogeneration and Polygeneration Volume 3 Mitigation Technologies Carbon Capture Negative Emissions System Carbon Transportation Carbon Storage Emission Mitigation Technologies Efficiency Improvements and Waste Management Waste to Energy Volume 4 Intelligent Energy Systems Future Electricity Markets Diagnostic and Control of Energy Systems New Electric Transmission Systems Smart Grid and Modern Electrical Systems Energy Efficiency of Municipal Energy Systems Energy Efficiency of Industrial Energy Systems Consumer Behaviors Load Control and Management Electric Car and Hybrid Car Energy Efficiency Improvement Volume 5 Energy Storage Thermal Energy Storage Chemical Storage Mechanical Storage Electrochemical Storage Integrated Storage Systems Volume 6 Sustainability of Energy Systems Sustainability Indicators Evaluation Criteria and Reporting Regulation and Policy Finance

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Heating and Cooling with Ground-Source Heat Pumps in Cold and Moderate Climates Vasile Minea,2022-04-19 Heating and Cooling with Ground Source Heat Pumps in Cold and Moderate Climates Fundamentals and Basic Concepts covers fundamentals and design principles of vertical and horizontal indirect and direct expansion closed loop as well as ground and surface water ground source heat pump systems It explains the thermodynamic aspects of mechanical and thermochemical compression cycles of geothermal heat pumps and describes the energetic economic and environmental aspects associated with the use of ground source heat pump systems for heating and cooling residential and commercial institutional buildings in moderate and cold climates Based on the author s more than 30 years of technical experience Focuses on ground source heat pump technologies that can be successfully applied in moderate and cold climates Discusses technical aspects as well as the most common and uncommon application fields of basic system configurations This work is aimed at designers of HVAC systems as well as geological mechanical and chemical engineers implementing environmentally friendly heating and cooling technologies for buildings

Geothermal Heat Pump Systems David Borge-Diez,Enrique Rosales-Asensio,2023-03-21 This book presents an overview of geothermal heating systems using ground source heat pumps in different countries It evaluates the emissions and energy costs generated by the operation of low enthalpy geothermal systems with heat pumps fed by different energy sources and assesses from an international point of view those policies whose aim is a sustainable low carbon economy The use of low impact energy sources is gradually growing with the aim of reducing greenhouse gases emission and air pollution The alternatives offered by geothermal systems are one of the key solutions for a future renewable development enabling the electrification of heating systems and the use of biofuels The book will be of interest to energy professionals and researchers

Heating and Cooling with Ground-Source Heat Pumps in Moderate and Cold Climates, Two-Volume Set Vasile Minea,2022-07-30 Heating and Cooling with Ground Source Heat Pumps in Moderate and Cold Climates Two Volume Set focuses on the use of very low temperature

geothermal energy for heating and cooling residential institutional and industrial buildings and aims to increase the design community's awareness and knowledge of the benefits design and installation requirements of commercial institutional building ground source heat pumps GSHP This set helps readers assess applicability select a GSHP system type and estimate building thermal load to ensure proper size for ground source subsystems appropriate brine and groundwater flow rates and apt design of building closed loops with distributed or central geothermal heat pumps The first volume addresses fundamentals and design principles of vertical and horizontal indirect and direct expansion closed loop as well as ground and surface water ground source heat pump systems It explains the thermodynamic aspects of mechanical and thermochemical compression cycles of geothermal heat pumps as well as the energetic economic and environmental aspects associated with the use of ground source heat pump systems for heating and cooling residential and commercial institutional buildings in moderate and cold climates The second volume focuses on applications and cases studies of ground source heat pumps in moderate and cold climates It details technical aspects as well as the most common and uncommon application fields of basic system configurations The principles of system integrations and applications in moderate and cold climates are also presented each followed by case studies This comprehensive work is aimed at designers of HVAC systems as well as geological mechanical and chemical engineers implementing environmentally friendly heating and cooling technologies for buildings

An Introduction to Thermogeology David Banks, 2012-08-13 This authoritative guide provides a basis for understanding the emerging technology of ground source heating and cooling It equips engineers geologists architects planners and regulators with the fundamental skills needed to manipulate the ground's huge capacity to store supply and receive heat and to implement technologies such as heat pumps to exploit that capacity for space heating and cooling The author has geared the book towards understanding ground source heating and cooling from the ground side the geological aspects rather than solely the building aspects He explains the science behind thermogeology and offers practical guidance on different design options An Introduction to Thermogeology ground source heating and cooling is aimed primarily at professionals whose skill areas impinge on the emerging technology of ground source heating and cooling They will be aware of the importance of the technology and wish to rapidly acquire fundamental theoretical understanding and design skills This second edition has been thoroughly updated and expanded to cover new technical developments and now includes end of chapter study questions to test the reader's understanding

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