



Canadian
GeoExchange
Coalition

Coalition
canadienne
de l'énergie
géothermique

Commercial Designers' Course

Burnaby, December 15-18, 2009
BCIT Burnaby

3700 Willingdon Avenue
Burnaby, BC, V5G 3H2

Global Quality GeoExchange™ Program®

The Canadian GeoExchange™ Coalition (CGC) is pleased to present its **Canadian GeoExchange™ Coalition Commercial Designers' Course**. The course is offered by one of our qualified trainers.

This training is part of an ongoing market transformation initiative started in 2001 by CGC and aiming at creating a unified, strong, and sustainable Canadian geexchange industry. This training is one of the six training modules developed by the CGC as part of its **CGC Global Quality GeoExchange™ Program®**.

The four-day comprehensive workshop is designed for geexchange engineers and engineering technologists and involves advanced design software. Architects, geologists, developers, manufacturers, distributors, dealers, installers, designers, excavators, representatives from public utilities, private utilities, and rural energy cooperatives, contractors, trenching/drilling, persons involved with technical environmental issues or sustainable energy, and individuals who desire a highly sophisticated understanding of this innovative technology can also benefit from this highly technical training.

Upon successfully passing the examination, you will receive a CGC Commercial Designers' Training Certificate which is the pre-requisite to apply for CGC Accreditation for industry professionals. Accreditation will help you open new markets and offer your customers an increased level of confidence knowing their system is designed by a qualified professional knowledgeable of Canadian standards, regulations, best practices and geology.

Instructor — Patrick Lambert, ing.

Patrick is an engineer who specializes in geexchange, ventilation systems, industrial plumbing and the design and production of industrial heat exchangers.

In recent years, he has been specializing in the design of geexchange systems of up to 400 tons of heating/cooling as well as the design of stadiums heated and cooled with geexchange energy.

Patrick has supervised a number of work sites and has overseen the startup of the systems. He has an in depth knowledge of geexchange adapted to Nordic climates. He has developed analysis equipment and work methods for the installation of geexchange systems.

Patrick is the president of Géoenergie. He completed his mechanical engineering degree at l'École Polytechnique and at l'Université du Québec à Trois-Rivières. He is a member of l'Ordre des ingénieurs du Québec since 1998.

The Canadian GeoExchange™ Coalition acts as the industry catalyst to unite private and public sector stakeholders, and to expand the market for ground source heat pumps and geexchange™ technology in Canada. As the nexus of information, training, certification, standards and public awareness, our mandate is to work with stakeholders to build the necessary infrastructure to foster the growth of the Canadian geexchange™ industry.

To learn more about the Coalition and its numerous efforts towards a structured market transformation of the Canadian geexchange market, please consult our website at

www.geoexchange.ca



Canadian GeoExchange™ Coalition

Commercial Designers' Course

Target audience: Individuals who are involved in the design of commercial geoeexchange systems, defined as systems servicing buildings of more than 15,000 square feet or three storeys. Persons or individuals who should take this course usually will be certified engineers or technologists or technicians and are authorized or required by law to perform certain duties on a geoeexchange site / project. Depending on the province, this person may be an HVAC or a refrigeration specialist. In some provinces, the design and installation of a geoeexchange system may require more than one such individual.

The Coalition offers the following six courses:

- ◆ Canadian GeoExchange™ Coalition Drilling, Well Construction and Loop Installation Course
- ◆ Canadian GeoExchange™ Coalition Installers' Course
- ◆ Canadian GeoExchange™ Coalition Residential Designers' Course
- ◆ Canadian GeoExchange™ Coalition Commercial Designers' Course
- ◆ Canadian GeoExchange™ Coalition Municipal Inspectors' Course
- ◆ Canadian GeoExchange™ Coalition Direct Expansion Course

Please note that the Installers' Course is a pre-requisite to both the residential and the commercial designers' courses. Contact the CGC to inquire about what course(s) best fit your needs.

Pre-requisite: CGC Installers' Course—pass **Duration:** 4 full days + examination **Cost:** CAN\$ 1,595.00

Outcome: Upon passing the examination with success, the trainee will receive a CGC Training Certificate. The successful trainee can then apply for CGC commercial designer accreditation. In addition to training, accreditation also requires the appropriate credentials in the province/territory where the individual is to perform his/her work as well as field experience and/or the appropriate supervision from an experienced designer. Please refer to the CGC Global Quality GeoExchange Program FAQ for further details

Training Overview

1: Introduction

Course Specifications
 Geoeexchange Means an Integrated Approach
 Designers & Project Management
 Geothermal Energy
 Geothermal – A Definition
 Geothermal Heat Pump
 Geoeexchange Systems
 What is a Geoeexchange System?
 General System Types – Distributed
 General System Types – Central
 General System Types
 Site Survey
 Ground Heat Exchanger (GHX)
 GHX Selection

2: Site Survey

Site Survey – What Is Groundwater?
 Site Survey – Hydrogeological Investigation
 Site Survey – Test Well Specification
 Site Survey – Sampling and Testing
 Site Survey – Test Well Reporting
 Site Survey – Water Quality
 Analyzing Groundwater for Pre-Contamination

3: Selection of GX System Type

4: Soil and Rock Properties for Canada – Drilling

Soil and Rock Properties for Canada
 Test Wells
 Test Boreholes
 Drilling Methods
 What Engineers Should Know About Drilling
 Test Borehole Log
 Thermal Conductivity Testing
 Soil and Rock Properties for Canada

5: Building Energy Analysis & Inter Seasonal Balancing

6: Loop Sizing

7: Borefield Design

8: Specification for Heat Exchanger

Specification for Heat Exchanger
 Specification for Vertical Heat Exchanger Construction
 Site Plan – Borefield
 Typical Pipe Sizing for All Circuits
 Run-Out Trench
 Pipe Sleeves through External Wall
 Mechanical Room Header Detail
 Specification for Horizontal Heat Exchanger

9: Grouting, Backfilling & Compacting

10: Thermal Fusing of Pipe Joints

11: Testing and Verification Control Strategies Testing Tricks

12: Pressure Testing / Flushing / Purging the Heat Exchanger

13: Charging the Heat Exchanger & Antifreeze Specification

14: Further on Central & Distributed GSHP System

Central and Distributed GSHP Systems
 Central and Distributed GSHP Systems – Simultaneous Heating and Cooling
 Central and Distributed GSHP Systems – Design Issues and Considerations
 Central and Distributed GSHP Systems – Heat Pump System Capacity & Zoning
 Central and Distributed GSHP Systems – Space Requirements
 Central and Distributed GSHP Systems – Comfort, Noise & Maintenance
 Central and Distributed GSHP Systems – First Cost
 Central and Distributed GSHP Systems – Ventilation Air
 Central and Distributed GSHP Systems – Operating / Energy Costs
 Central and Distributed GSHP Systems – Central GSHP Plants
 Central and Distributed GSHP Systems – Outdoor Air

15: Heat Pump Sizing and Selection

16: Pumping

17: Final Steps – Troubleshooting

Final Steps: Pre-Start-Up Checks
 Final Steps: Heat Pump Start-Up
 Final Steps: Training Facility Maintenance Staff
 Final Steps: Preparing the O & M Manual
 Final Steps: Turnover
 Final Steps: Troubleshooting
 Commissioning Information Requirements
 Troubleshooting GSHP Systems – Heat Pump Unit
 Troubleshooting GSHP Systems – Ground Heat Exchanger

18: Isolated Loop Groundwater – Column Wells (Informative Only)

Isolated-Loop Groundwater System Design
 Isolated-Loop Groundwater – General Design Guidelines
 Isolated-Loop Groundwater – Well Design
 Isolated-Loop Groundwater – Discharge
 Isolated-Loop Groundwater – Plate-Frame HX
 Isolated-Loop Groundwater – Piping and Pumping Design
 Brief Overview of Direct and Standing Column Wells

19: Pond Loop

Introduction to Pond Loops
 Sizing the Pond Loop HX
 Pond Loop HX Layout

20: Hybrid Systems

21: Annex – Load Calculations



The CGC Global Quality GeoExchange™ Program®

A step by step program schematic from training and accreditation of individuals, qualification of firms and system certification

STEP 1—TRAINING

- ◆ Training is required for all **individuals** directly involved in the design or installation of a geoechange system.
- ◆ There are **six distinct** training courses available in Canada:
 - ⇒ Training for drillers: **Canadian GeoExchange™ Coalition Drilling, Well Construction and Loop Installation Course**
 - ⇒ Training for installers: **Canadian GeoExchange™ Coalition Installers' Course**
 - ⇒ Training for residential designers: **Canadian GeoExchange™ Coalition Residential Designers' Course**
 - ⇒ Training for commercial designers: **Canadian GeoExchange™ Coalition Commercial Designers' Course**
 - ⇒ Training for municipal inspectors: **Canadian GeoExchange™ Coalition Municipal Inspectors' Course**
 - ⇒ Training for DX installers: **Canadian GeoExchange™ Coalition Direct Expansion Course**
- ◆ Courses details are available on CGC website at www.geo-exchange.ca

STEP 2—APPLICATION FOR INDIVIDUALS ACCREDITATION

- ◆ CGC **training certificates or equivalent are required** to apply for accreditation.
- ◆ Please **read carefully** the accreditation application forms (a different application form is available for drillers, installers, residential designers and for commercial designers) for all the rules and conditions pertaining to accreditation
- ◆ For training equivalency and recognition of experience in the geoechange industry, please **read carefully** the **CGC Clarification Statement on CGC Global Quality GeoExchange™ Program®** AND the Installer Training Equivalency Criteria for Accreditation Under the **Global Quality GeoExchange™ Program®** as issued on May 30th, 2007.
- ◆ Every individual interested in participating in CGC Global Quality GeoExchange™ Program® **MUST** apply for accreditation.

STEP 3—APPLICATION FOR COMPANY QUALIFICATION

- ◆ Companies/contractors, hiring CGC accredited individuals for drilling, installation or design, either as full time employees or as subcontractors, must be qualified under the **CGC Global Quality GeoExchange™ Program®**. For most of the companies/contractors, this will only be a simple formality.
- ◆ However, company qualification is an important step to ensure **quality installation** and **consumer protection**:
 - ⇒ It allows the CGC to verify the credentials of the companies/contractors who will ultimately provide the consumers with a guarantee on their geoechange system.
 - ⇒ It will allow the CGC to screen out of the **CGC Global Quality GeoExchange™ Program®** companies/contractors that have been found guilty of various professional malpractice and/or breach of CGC Code of Conduct.
 - ⇒ Etc.
- ◆ Qualification of companies will allow CGC to recognize the highest quality of workmanship, and highest ethical standard and screen out mushroom companies only interested in short terms gains and benefits.
- ◆ Company/contractor qualification is also an important step in the CGC management of the consumer complaint mechanism.

STEP 4—APPLICATION FOR SYSTEM CERTIFICATION

- ◆ A **CGC Certified GeoExchange™ System** is a geoechange system on which CGC accredited drillers, installers and designers have been involved.
- ◆ A **CGC Certified GeoExchange™ System** is a geoechange system that follows C-448-02 at a minimum.
- ◆ A **CGC Certified GeoExchange™ System** is a geoechange system that fully satisfies all relevant municipal, provincial and federal regulations.
- ◆ A **CGC Certified GeoExchange™ System** is a geoechange systems that meets CGC Certification Guidelines.
- ◆ A **CGC Certified GeoExchange™ System** is the condition to access utilities programs, as well as provincial and federal grants programs if and when available.



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Registrations received after December 1st will have a \$100 late booking surcharge and attendees will pick up their course materials at the course rather than having them shipped directly

Section 1—Registration Details

MR MS FIRST NAME _____ LAST NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

DELIVERY ADDRESS _____
(IF DIFFERENT FROM ABOVE)

CITY _____

PROVINCE / STATE _____ POSTAL CODE / ZIP CODE _____

E-MAIL _____

PHONE _____ FAX _____

BACKGROUND (position, experience, interest) _____

HOW did you hear about this course ? _____

Do you have any food allergies? _____

I have completed the CGC Installers' Course YES NO

Section 2—Payment Details

Please use this registration form as your invoice

Course registration fee is CAN\$ 1,595.00 + applicable taxes (before December 1st)

Newfoundland, New Brunswick, Nova Scotia : \$ 1,802.35 — Québec: \$ 1,800.36 — All Other Provinces: \$ 1,674.75 — USA: \$1,595.00

Registration fee includes an extensive reference manual which reflects Canadian codes, standards and regulations, Canadian best design practice, geological conditions and temperatures, a copy of the current ASHRAE reference materials, Power Points for in-class training.

Please note that the delivery of this training session is offered by GeoExchangeBC. All correspondence regarding the delivery of this course should be addressed directly to GeoExchangeBC.

CHEQUE ENCLOSED

Cheques should be made to the order of GeoExchangeBC

Please mail this registration form with your payment to:

Upon reception of payment, final course details will be sent to registered participants.

GeoExchangeBC:

12035 56th Avenue
Surrey, BC V3X 2W9

Please send registration form to the attention of Kim Savage at GeoExchangeBC. You may also address your questions and inquiries to:

Kim Savage at 604-596-0696
admin@geoexchangebc.com