



Canadian
GeoExchange
Coalition

Coalition
canadienne
de l'énergie
géothermique

Municipal Inspectors' Course

September 12-13, 2011

**Location: Hilton Vancouver Metrotown
6083 McKay Avenue, Burnaby, BC, V5H 2W7**

Course offering is conditional upon sufficient student enrollment

Global Quality GeoExchange™ Program®

The Canadian GeoExchange™ Coalition (CGC) is pleased to present its **Canadian GeoExchange™ Coalition Municipal Inspectors' 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 the CGC and aiming at creating a unified and strong Canadian geoechange industry. This training is one of the 5 training modules developed by the CGC as part of its **CGC Global Quality GeoExchange™ Program®**.

The two-day comprehensive workshop is designed for Municipal Inspectors responsible for building, HVAC, systems or infrastructure, as well as municipal energy and community planning staff, code officials, and developers, architects, manufacturers, distributors, dealers, installers, engineers, plumbers, designers, homeowners, excavators, geologists, contractors involved with HVAC, trenching/drilling, ducting etc., persons involved with environmental issues or sustainable energy, and those who desire a working knowledge of inspection issues around innovative technology. Representatives from public utilities, private utilities, and rural electric cooperatives can also benefit from this training.

Upon successfully passing the examination, you will receive a **CGC Training Certificate** which will help you assert competence to fully inspect where legally authorized and also offer Municipality residents and customers an increased level of confidence knowing their system is inspected by a trained and informed official who is knowledgeable of Canadian standards, regulations, and geology.

Instructor — Dennis Terhove

Dennis Terhove is the Energy Codes Officer (Inspector) with the City of Calgary's Building Regulations Division. As well as being a Safety Codes Officer, Dennis has over 30 years of experience in the mechanical trades with a variety of background experiences in HVAC, geoechange, plumbing & gas, and hydronic heating and cooling systems in residential, commercial, and industrial applications.

In 2005, Dennis was tasked with establishing Calgary and Canada's first permit and inspection process for geoechange projects. The culmination of this was a full plans approval, permit application and field inspection protocol for any scope of geoechange system within the City of Calgary. This procedure was implemented in September, 2006 and since then been used as a template for jurisdictions across the country. He has gone on to present the position of the Building Regulations Division to numerous groups across Canada and the U.S.

Due to the interest in Calgary's procedures, Dennis put together a training program on permit and inspection procedures for geoechange systems. This joint venture between the Canadian Geoechange Coalition and the City of Calgary is based on the National Building Code of Canada and the CAN/CSA C448 standard. While this course was designed specifically for municipal inspectors and plans examiners, it is also applicable to those who would like to understand geoechange from the perspective of the Authority Having Jurisdiction such as architects, engineers, designers, etc.

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 geoechange™ 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 geoechange™ industry.

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

www.geoexchange.ca



Canadian GeoExchange™ Coalition Municipal Inspector's Course for GeoExchange Systems® Course Description

Target audience: Individuals who are involved in the inspection of geoechange systems but who are not engaged in the installation or design of the system itself. The persons or individuals who should take this course usually belong to a trade or technical profession and are authorized or required by law to perform certain duties on a geoechange site / project. Depending on the province, this person may be an HVAC or buildings specialist. In some provinces, the inspection of a geoechange system may require more than one such individual.

The Coalition also offers the following three courses:

- ◆ Canadian GeoExchange™ Coalition Installers' Course®
- ◆ Canadian GeoExchange™ Coalition Residential Designers' Course®
- ◆ Canadian GeoExchange™ Coalition Commercial Designers' Course®

Please note that the CGC 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: None **Duration:** 2 full days + examination **Cost:** \$595 + tax

Outcome: Upon passing the examination with success, the trainee will receive a **CGC Training Certificate**. This Certificate is complementary but not directly relevant to becoming a CGC Accredited professional. CGC can not and does not accredit code or regulatory personnel. Please refer to the CGC Accreditation and Certification Program for further details on the quality program.

Training material: Course material includes a reference which reflects Canadian codes, standards and regulations, Canadian geological conditions and temperatures, a copy of the current CSA 448 Standard, and ~548 + Power Points for in-class training and other relevant documentation.

Training Overview

SECTION I - Introduction

Introduction
Source material
Table of Contents
Glossary

SECTION II – The Basics of Geoechange

A Definition
Geothermal Energy
Fundamentals of Geoechange Systems
Course Specifications
Installers and Project Management

SECTION III – Site and Building Evaluation

Heat Loss / Heat Gain Basics
Site Survey Worksheet
Review of Existing Geotechnical Records

SECTION IV – Soil and Rock Properties Classification Classifying Soil and Rock Properties Further Reading

SECTION V – Configuring the Ground Heat Exchanger

Deciding on Open or Closed Loop
Site Survey – What is Groundwater?
Site Survey – Water Quality
Site Survey – Hydrogeological Investigation
Site Survey – Commercial Installation Consideration
Site Survey – Test Well Specification
Site Survey – Sampling and Testing
Site Survey – Test Well Reporting
Production Well Development – Open Loop
Rejection Well Considerations
Other Installation Considerations
Production Well Development – Closed Loop
Production Well Development – Pond Loop
Deciding on Horizontal or Vertical Heat Exchanger
- Closed Loop
Horizontal Trench Length and Configuration – Closed Loop
Vertical Heat Exchanger Length and Configuration
- Closed Loop
Drilling and Trenching Equipment
Installing the Heat Exchangers
Grouting and Backfilling
Assembly and Installation of the HX – Lake Loop
Trenching and Excavation – Lake Loop
Laying Runouts in Trenches – Lake Loop
Flushing and Purging
Selecting Antifreeze and Concentration
Charging the Heat Exchanger

Calculating Flow Rate and Pressure Loss
Building Penetration / HX Installation
Further Reading

SECTION VI – Considering and Dealing with Distribution Systems

Locating the Heat Pump Unit
Mechanical Room Connection
Connecting the GHX to the Heat Pump(s)
Radiant Floor Heating with Water-to-Water Heat Pump(s)
Water-to-Water Systems
Air System Design
Further Reading

SECTION VII – Commission and Post-Installation

Residential Pre-Start-Up Checks
Residential Heat Pump Start-up
Pressure Drop Test & Calculations
Residential: Heating Performance Check
Residential: Heating Performance Check – Review
Residential: Final Steps of Installation – “As Built” Book
Commercial: Pre-Start-Up Checks
Commercial: Heat Pump Start-Up
Commercial: Training Facility Maintenance Staff
Commercial: Preparing the O&M Manual
Commercial: Turnover
Troubleshooting GSHP Systems – Heat Pump Unit
Troubleshooting GSHP Systems – Ground Heat Exchanger
Commercial: Testing and Verification

SECTION VIII – Codes and Standards

CAN/CSA C-448.2 Series-02 (Residential and Small Buildings)
CAN/CSA C-448.1 Series-02 (Commercial)
National Building Code of Canada 2005

SECTION IX – Permits and Inspections

Compliance
Permits
Inspections

SECTION X – Supplementary Materials and CSA-448



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 geexchange system.
- ◆ There are **four distinct** training courses available in Canada:
 - ⇒ 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™ Municipal Inspectors' Course®**
- ◆ Courses details are available on CGC website at www.geoexchange.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 geexchange 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. Municipal Inspectors are not accredited by CGC.

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 geexchange 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 geexchange system on which CGC accredited drillers, installers and designers have been involved.
- ◆ A **CGC Certified GeoExchange™ System** is a geexchange system that follows C-448-02 at a minimum.
- ◆ A **CGC Certified GeoExchange™ System** is a geexchange system that fully satisfies all relevant municipal, provincial and federal regulations.
- ◆ A **CGC Certified GeoExchange™ System** is a geexchange 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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DEADLINE TO REGISTER AUGUST 31st. NO REFUNDS WILL BE ISSUED AFTER THIS DATE

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) _____

Have you taken the CGC Installers' course ? _____

Do you have allergies to any foods? _____

Section 2—Payment Details

Please use this registration form as your invoice

Course registration fee is CAN\$ 595.00 + applicable taxes

Newfoundland, New Brunswick, Ontario : \$672.35- Nova Scotia: \$684.25 - Québec: \$677.85 - BC: \$666.40 - All Other Provinces: \$624.75

Registration fee includes an extensive reference manual which reflects Canadian codes, standards and regulations, Canadian geological conditions and temperatures, a copy of the current CSA 448 Standard, other relevant documentation and an examination fee.

Section 3—Method of Payment

Payment must be received prior to the beginning of the course.

VISA MASTER CARD CHEQUE (Cheques should be made to the order of CGC)

(Should you prefer to provide your credit card information over the phone, please call the number below.)

CREDIT CARD NUMBER: _____ EXPIRY DATE (MM/YY): _____

CARDHOLDER NAME: _____

CARD HOLDER'S SIGNATURE: _____

Please mail this registration form with your payment to:

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

Canadian GeoExchange Coalition

1030 rue Cherrier, #405

Montréal (Québec) H2L 1H9

or by fax at (514) 807-8221

Please send registration form to the attention of Nisha Thiyagarajah at the Canadian GeoExchange Coalition. You may also address your questions and inquiries to:

Nisha Thiyagarajah 514-807-7559 x28

nisha@geoexchange.ca