Canadian GeoExchange Coalition
Coalition canadienne de l'énergie géothermique

APPLICATION FORM

GEOEXCHANGE SYSTEM CERTIFICATION

(rev. October 2009)

INSTRUCTIONS TO COMPLETE THIS CERTIFICATION FORM

1) All spaces must be completed with information or "N/A" if not applicable
2) A copy of this document must be kept by the customer and one copy sent to the Canadian GeoExchange Coalition (CGC). Complete one form for each operating heat pump system. Where one heat pump system (at one given civic address) uses more than one heat pump unit, applicants must provide serial numbers and any particular details in section IV, subsection seven, "Other System Specifications."
3) Incomplete forms will be returned to applicants for completion, before approval can be granted. Please therefore fully complete this form. Please ensure that all sections are fully completed.
4) Instructions for each section are generally provided at the beginning of each section, next to section titles.
5) If normal CGC or CSA protocols are not followed in the completion of this form, the professional responsible for the work should provide a separate page describing the deviation, the reasoning for it, and requesting a specific exception for specific reasons. Please note that CGC will not and does not guarantee that any accommodation will be made in certifying systems which do not follow to the letter of C-448-02.
6) This Certification Form may be used to fit the needs of financial assistance programs developed by utilities, municipality, provincial and federal governments and other stakeholders. Please be as accurate as possible in providing information, as the approval of financial assistance to customers may depend on the quality and accuracy of the information provided herein.
7) Note that when interpreting C-448 or local requirements, the Authority Having Jurisdiction—usually represented by a Municipal Inspector or provincial building code authority — may serve as a resource and holds the final word around permitting.
8) Once this form is complete, all information will be kept confidential by CGC except for any authorized used per Section VII of this form, or as ordered by a Court of Law having jurisdiction in Canada.

Certification fee: *125 $ (including taxes)*

Installation companies are invited to cover the system certification fee, complete this form and return to the Canadian GeoExchange Coalition as a service to their own customers.

A numbered certificate (sticker) to be fixed visibly on the system along with a 8 1/2 x 11 paper certificate will be mailed directly to the customer. Depending on the province and the financial assistance program you are applying for, you will need to either produce the certificate number or a copy of the paper certificate.

Why pay a Certification fee? Why demand CGC System Certification?

Certification confirms that the System installed at the address listed in Section I-B has been designed and installed in full compliance with standard **C448 Series-02** ***Design and Installation of Earth Energy Systems (amended)***. In addition, part of the certification process requires that the installation team review your system materials and operating procedures with you (the customer), and provide documentation which can be of essential help in the unlikely event of a system problem. Finally, certification means that design and installation professionals have passed the industry standard training courses in the technology, conduct their business affairs honourably in general, and already have a positive track record of high quality installations. The Certification fee helps CGC manage this quality process.

Please return the completed form accompanied with supporting documents and payment to:

By mail: **Canadian GeoExchange Coalition**
1030 Cherrier St, Suite 405
Montréal (Québec) H2L 1H9

By Fax: **(866) 643-1375**

Or scan and e-mail to: **marie-claude@geo-exchange.ca**

Canadian GeoExchange Coalition / Coalition canadienne de l'énergie géothermique

Application Form — CGC System Certification

Please complete and return:

- Pages 1 to 5 *ONLY.*
- Include a copy of the site worksheet *(use the blank form in CSA 448 or your own company worksheet)*
- A drilling report for each borehole if a borehole was constructed *(use the model provided by CGC or government-approved drilling log, or company borehole / loop installation report containing the same information)*
- A summary report of the heat loss calculation *(do not send the entire document, just the summary)*
- A copy of the municipal building permit for work and renovation *(if required by your municipality or provincial government)*
- A payment of $125 for the analysis and certification process

I. SYSTEM OWNER IDENTIFICATION

System Owner's Name: _____

Address of installation: _____

Address (line 2): _____

City: _____ Province/State: _____ Postal/Zip Code: _____

Mailing Address (if different from the above)

Address : _____

City: _____ _____ _____

Telephone: _____ Fax: _____

E-mail: _____

II. CGC ACCREDITED PROFESSIONALS INVOLVED IN THE DESIGN, DRILLING AND INSTALLATION OF THE GEOEXCHANGE SYSTEM

1) Accredited Installer: _____ CGC Accreditation Number: _____

2) Accredited Designer: _____ CGC Accreditation Number: _____

3) Qualified (Drilling) Firm: _____ CGC Qualification Number: _____

If relevant, please list all other professionals involved in the installation of this geoexchange system. Depending on the province or municipality, this may include general contractors, subcontractors, drillers, electricians, plumbers, and/or other construction professionals.

Please use another sheet if you need to provide more names.

1) Name of professional : Title & Role on this Project: (e.g. General Contractor, Sub, etc.) _____

2) Name of professional : Title & Role on this Project: (e.g. General Contractor, Sub, etc.) _____

III. CSA 448 DESIGN AND INSTALLATION COMPLIANCE & COMMISSIONING REPORT

(To be completed by a CGC accredited professional)

1. General Information on the Building and the GeoExchange System Use

New construction: ☐ Existing building: ☐ Type of building (bungalow, cottage, etc,): _____

If existing building:
- Type of heating system before retrofit: _____
- Type of cooling system before retrofit: _____
- Age of the building: _____
- Insulation work completed: _____
- Size of the building in ft^2 or m^2 (excluding basement): _____

Geoexchange system used for:
- Living area space heating & cooling ☐
- Domestic water heating ☐
- Pool water heating ☐
- Sauna ☐
- Heating & cooling of other adjacent buildings ☐
- Other _____

Date installation work began: _____ Date installation work ended: _____ Total costs of geoexchange installation & design: _____

2. Specific System Information (Note: System boundaries include ground loop, any storage tanks, heat pump, distribution system and controls system for heat and cool)

Type of distribution system : Forced-air ☐ Hydronic ☐

A copy of load calculations was given to the customer ☐

Heat pump make: _____

Heating capacity: _____

Coefficient of performance—heating (nominal): _____

Check off appropriate entering water temperature (Refer to CAN/CSA-C13256); if this is a Direct Expansion (DX) system, choose zero degrees C.

Design heat load (building) : _____

Design cooling load (building) : _____

Model / Serial No. : _____

Cooling capacity: _____

Seasonal energy efficiency rating: _____

Heating: 0° C ☐ 10° C ☐ Cooling: 25° C ☐ 15° C ☐

3. Loop Information (Note: complete closed loop information as relevant after marking DX or GX as system type)

Open-Loop ☐ Flow: _____ ☐ Imp. Gallon / hour (data from driller) or ☐ US gallon / min

Closed-Loop

DX System : ☐ Refrigerant Type : _____ Refrigerant Charge (lbs) : _____

GX System: ☐ Heat transfer fluid : _____ Concentration (%): _____

Vertical ☐ / Diagonal ☐
- Type of soil at depths: _____
- Number of boreholes : _____ Depth of boreholes : _____ Flow : _____ US gallon / min

Horizontal ☐
- Types of soil : _____
- Depth of loop / heat exchanger: _____ Length of heat exchanger: _____
- Flow: _____ US gallon / min Pipe(s) diameter : _____

Pond Loop ☐
- Depth of loop / heat exchanger: _____ Length of heat exchanger: _____
- Flow: _____ US gallon / min Pipe(s) diameter : _____

4. Full Load Operating Conditions

Turn off the desuperheater and emergency heating unit if applicable. For commissioning and measurement of operating conditions, please operate to full capacity (compressor and EMC at 100 %) and all zones open. Do not forget to turn the desuperheater and the emergency heating unit back on if applicable.

	HEATING			COOLING		
	In	Out	Delta	In	Out	Delta
Air — Distribution System	_____ °F	_____ °F	ΔT= _____ °F	_____ °F	_____ °F	ΔT= _____ °F
Water — Distribution System (Hydronic Systems)	_____ °F	_____ °F	ΔT= _____ °F	_____ °F	_____ °F	ΔT= _____ °F
Water temp—Heat Pump	_____ °F	_____ °F	ΔT= _____ °F	_____ °F	_____ °F	ΔT= _____ °F
Pressure (source)	_____ PSI	_____ PSI	ΔP= _____ PSI	_____ PSI	_____ PSI	ΔP= _____ PSI
Pressure (load)	_____ PSI	_____ PSI	ΔP= _____ PSI	_____ PSI	_____ PSI	ΔP= _____ PSI
Compressor	_____ amps			_____ amps		
Ventilator	_____ amps			_____ amps		

5. System Components

- ☐ 1. Auxiliary heating
- ☐ 2. Desuperheater
- ☐ 3. Anti vibration
- ☐ 4. Pumping kit (non-DX)
- ☐ 5. Filter _____
- ☐ 6. Thermostat, model _____
- ☐ 7. Flow reader
- ☐ 8. Pete's plug
- ☐ 9. Humidification _____
- ☐ Other _____

6. Emergency Heating Unit (for distribution systems only)

	In	Out	Delta
Air	_____ °F	_____ °F	ΔT= _____ °F

Voltage (measured) _____ V

CFM = $\frac{\text{kW x 3414}}{\text{1,08 x ΔT°F}}$ = _____

Nominal capacity : _____ kW Nominal voltage : _____ V

7. Other System Specifications (*for example, if there are more than one heat pump, include all the HP unit model & serial numbers here***).**

IV. AFFIDAVIT — To be completed and signed by the company / firm representative providing workmanship guarantee on the system

Solemn declaration of professional in construction industry

I, undersigned, _____
[name

_____
[position]

for _____
[Company]

having its principal place of business located at

_____

(hereinafter referred to as the "**Company**"), hereby solemnly declare that:

I am the _____[position] for the Company and I have held this position since _____[year].

1. Because of my functions and position within the Company, I am generally aware of its business activities and possess full authority to represent it herein by subscribing to this solemn declaration. I am particularly aware of the circumstances surrounding it and I have access to all relevant documents and information.
2. To the best of my and the Company's knowledge, all the information contained in this application is true and accurate.
3. Although **membership in the CGC** is not mandatory to apply for Certification, all the work related to the system within this form **("System")** has been conducted in accordance with and meets the highest ethical standards in geoexchange work.
4. The Company understands, accepts and recognizes that Certification is only granted to systems which at a minimum meet current Standards for design and installation (or accepted government deviations / utility program requirements), and meet current Canadian standards for safety and performance.
5. The Company understands, accepts and recognizes that unless and until an industry recognized standard is formally adopted, Certification does not cover standing column well systems.
6. The System installed at the address listed in Section I-B has been designed and installed in full compliance with the *C448 Series-02 Design and Installation of Earth Energy Systems* standard, as specified in the National Building Code and provincial codes.
7. The Company understands, accepts and recognizes that a false declaration may result in the loss of its accreditation / qualification status with the CGC.
8. The Company understands, accepts and recognizes that Certification can be immediately revoked at any time, at the sole discretion of the CGC, and without any formality, if the Company fails to provide or to continue providing evidence that the System is designed, installed and is performing to standards, per instructions in this certification form.

Signed in [city / province] _____

This [day / month] _____ of [year] _____

Signature: _____

_____
Please print name

Witness: _____

_____
Please print name

Client's Understanding and Approval of Certification

I, undersigned, _____
[name

domiciled and residing at _____
[address]

_____

hereby solemnly declare that:

1. I am applying to the Canadian GeoExchange Coalition ("**CGC**") to have the System certified. I am the owner of the System.
2. I understand that one of the criteria for CGC certification ("**Certification**") is that I verify that the System has been delivered in good order along with the "As-built" book .
3. In this regard, I hereby confirm that a member of the installation team has provided me with:
   - A full ***As-Built*** book, consisting of initial site survey, final site survey, evidence of system labelling (supply and return fluid lines, loop charging valves, each clearly marked with dates), Material safety data sheets for loop fluids, any manufacturer documentation including owner's guides and manuals, any manufacturer guarantees or warranties for equipment, installing company guarantees, and any relevant photographic documentation;
   - current service contact information; and
   - a copy of the *CSA 448 Design and Installation Compliance and Commissioning Report* (Section IV of this document).
4. I understand and agree that Certification or CGC Accreditation is not a substitute for my own due diligence regarding the drilling, design and installation of the System, including but not limited to contractor review and oversight, reference verification and credit verification.
5. I understand and agree that CGC's program is not in any way a substitute for the moral, contractual and legal responsibilities of the workers involved with the project.
6. As an express and essential condition for entering into this quality programme agreement, I hereby agree and understand that the CGC shall not in any way be legally or contractually responsible or liable for any claims, demands, suits and costs, including attorneys fees, arising out of drilling, design and installation of the System or any direct or indirect damage or prejudice caused by it.
7. I authorize the CGC to share all required information with the programs from which I am seeking financial or other assistance or support.
8. I authorize CGC personnel or designated representatives of the CGC to physically inspect my System in order to ensure its conformity with codes, standards and other regulations in my municipality or province.
9. To the best of my understanding this system has been installed and designed properly in accordance with all applicable standards, laws and regulations.
10. The geoexchange system named in this application is providing heating and cooling satisfactorily, and though I reserve all legal rights regarding future problems, I am at this time satisfied with the work and workmanship conducted, including the professional ethics and all efforts made by the professionals named in this application.

Signed in [city / province] _____

This [day / month] _____ of [year] _____

Signature: _____

_____
Please print name

Witness: _____

_____
Please print name

CGC GeoExchange Drilling Report

DRILLING FIRM, NAME & ADDRESS:

BOREHOLE NO.

WORK LOCATION:

MUNICIPALITY

UNITS USED BELOW: Imperial / Metric / SI

Canadian GeoExchange Coalition — Coalition canadienne de l'énergie géothermique

1030, rue Cherrier Street
Bureau 405
Montreal, Qc., H2L 1H9
Fax: 514 807 8221

DATE OF DRILLING:

OPERATOR NAME:

EQUIPMENT (drill rig)

DEPTH

Overburden :
Weathered rock:
Competent rock:
TOTAL DEPTH:

MATERIAL DESCRIPTION

CASING (if used)

CASING DEPTH (LENGTH):
DIAMETER (INT).:
DIAMETER (EXT).:

GEO PIPE (HDPE/Copper, C448 compliant)

POLYETHYLENE PIPE SDR:
DIAMETER (INT).:
COPPER PIPE:
DIAMETER (INT).:

FLOW (Q)

Q END DRILLING:
STATIC LEVEL:

HORIZONTAL SECTION

DEPTH OF:
Excavation:
Pipes:

DEPTH (m / ft)	GEOLOGY: CUT	GEOLOGY: LITHOLOGY DESCRIPTION	Water (fracture): FLOW (m^3/h or GPM)	Water (fracture): DEPTH	DRILL ADVANCE AND GEOTHERMAL WORK: GEOTHERMAL HOLE BUILDING	METHOD DIAMETER	ADVANCE SPEED (m/h) 10 30 50 70
10 (33)							
20 (66)							
30 (99)							
40 (132)							
50 (165)							
60 (198)							
70 (231)							
80 (264)							
90 (297)							
100 (330)							
150 (495)							
200 (660)