

Memorandum of Understanding between
The United States Environmental Protection Agency
and
(Company Name)

I. Common Agreements and Principles

A. This is a voluntary agreement between Geothermal Heat Pump Manufacturer ("EPA ENERGY STAR Partner" or "Partner") and the United States Environmental Protection Agency (EPA), by which Geothermal Heat Pump Manufacturer joins the EPA ENERGY STAR[®] Program. The terms of this Memorandum of Understanding (MOU) shall apply to geothermal heat pumps sold by Partner under its own brand name(s).

B. EPA ENERGY STAR Partner and EPA agree that the primary purpose of the EPA ENERGY STAR Program is to promote the manufacturing and marketing of energy-efficient equipment, thereby potentially reducing combustion-related pollution.

C. EPA ENERGY STAR Partner and EPA agree that the use of energy-efficient equipment may also increase profits and competitiveness.

D. EPA ENERGY STAR Partner and EPA agree that the EPA ENERGY STAR Program may also improve or enhance equipment's useful lifetime, customer satisfaction, and overall product quality.

E. EPA ENERGY STAR Partner and EPA agree that publicizing the EPA ENERGY STAR Program is important to demonstrate the following: the concern of Partner for the environment, the vitality of the free enterprise system in reducing costs, and the capability of voluntary programs to achieve environmental goals.

F. EPA ENERGY STAR Partner and EPA agree that maintaining public confidence in the EPA ENERGY STAR Program is critical to achieving the shared goals of Partner and EPA.

G. EPA ENERGY STAR Partner and EPA agree that membership in the EPA ENERGY STAR Program is essential to the cooperative effort to achieve the shared goals stated above.

II. Definitions

A. Geothermal Heat Pump: A geothermal heat pump model uses the thermal energy of the ground or groundwater as the heat source and heat sink for residential space heating and/or cooling. It may provide both space heating and cooling, cooling only or heating only functions. A geothermal heat pump model consists of one or more factory-made assemblies that normally include an indoor conditioning coil with air moving means, compressor(s) and refrigerant to fluid heat exchanger(s). In addition, for the purposes of this MOU, some or all of the domestic water heating shall be provided through the use of a desuperheater, integrated demand water heater or a separately installed compressor that provides

demand water heating. The Geothermal heat pump includes all the equipment and connections from the point at which the ground heat exchanger enters the house, except for indoor equipment that was installed by someone not representing the manufacturer or manufacturer's representative, such as the ground heat exchanger installer.

B. Single Speed Models: Geothermal heat pumps that are designed to run at one speed and one capacity (as compared to Multi-Speed Units described below). These provide the appropriate amount of heating or cooling primarily by cycling on and off.

C. Multi-Speed Models: Geothermal heat pumps that are manufactured to operate at more than one speed through the use of technologies such as multiple speed compressors, dual compressors, etc.. These models are designed to be more efficient while running on low speed, but have the capacity to supply more heating or cooling at high speed.

D. Ground Heat Exchanger: The method by which heat is exchanged with the ground, groundwater or surface water. Geothermal heat pumps may use any form of ground heat exchanger, which may include: horizontal or vertical closed loops, open loop vertical wells or surface water. For the purposes of this MOU, the ground heat exchanger comprises all the equipment (piping, connections, grouting, etc.) that is installed outside the house, and up to the point it enters the house and any equipment or connections that the ground heat exchanger contractor installs inside the house.

E. Closed Loop System: A ground heat exchanger in which the heat transfer fluid is permanently contained in a closed system.

F. Open Loop System: A ground heat exchanger in which the heat transfer fluid is part of a larger environment. The most common open loop systems use ground water or surface water as the heat transfer medium.

G. Direct Expansion (DX): A geothermal heat pump system in which the refrigerant is circulated in pipes buried in the ground, rather than using a heat transfer fluid, such as water or antifreeze solution in a separate closed loop, and fluid to refrigerant heat exchanger. For the purposes of this MOU, a DX system includes all of the equipment both inside and outside the house. DX systems may be single or multi-speed.

H. Desuperheater: A partial heat recovery system that captures heat from the hot refrigerant as it leaves the heat pump compressor and transfers it to the domestic hot water. Desuperheaters provide hot water only while the heat pump is providing space conditioning.

I. Integrated Demand Water Heating: For purposes of this MOU, this term is used to describe geothermal heat pumps that include a water heating function in the refrigeration cycle. Integrated demand water heating differs from desuperheater in that the integrated demand water heating model provides all or nearly all of the domestic hot water needs and provides hot water even when space conditioning is not required. This includes systems that employ the use of a separate water heating compressor unit or that use the same compressor for space conditioning and water heating. Also sometimes referred to as full-demand or demand water heating.

J. COP: Coefficient of Performance - A measure of efficiency in the heating mode that represents the ratio of total heating capacity to electrical energy input. For the purpose of this MOU, COP will be calculated in accordance with the Air-Conditioning and Refrigeration Institute (ARI) 330-93 for Ground Source Closed-Loop Heat Pump Equipment conditions or 325-93 for Ground Water-Source Heat Pump Equipment conditions as stated in section IV below.¹ For Direct Expansion systems, COP will be calculated in accordance with the Canadian Standards Association (CSA) standard C748-94 Performance of Direct Expansion (DX) Ground Source Heat Pumps conditions.²

K. EER: Energy Efficiency Ratio - A measure of efficiency in the cooling mode that represents the ratio of total cooling capacity to electrical energy input. For the purpose of this MOU, EER will be calculated in accordance with ARI 330-93 or 325-93 rating conditions as stated in section IV below. For DX systems, EER will be calculated in accordance with the CSA standard C748-94 Performance of Direct Expansion (DX) Ground Source Heat Pumps conditions.

L. Manual J Calculation: A calculation performed to determine the heating load for a residence or small commercial building. The calculation shall include site-specific characteristics such as regional weather data, building framing materials, building insulation levels, building air infiltration levels and window area. The calculation follows procedures and protocols developed by the Air Conditioning Contractors of America (ACCA).³

M. Manufacturer Limited Warranty: For the purpose of this MOU, a manufacturer limited warranty is an assurance by the Partner or Partner's representative (i.e. dealer or distributor) that purchased system equipment and components are warranted for a minimum of two years. Major components, including the compressor(s), heat exchanger(s), air coil(s), expansion and reversing valve(s) shall be warranted for a minimum of five years. The exact terms of the limited warranty, given these minimum specifications, shall be determined by the Partner.

III. Entry into Force and Duration

A. This MOU enters into force when signed by both EPA and Partner.

B. Both parties agree to the following schedule for implementing the specifications contained in this MOU.

¹For more specific information regarding the ARI standards, contact ARI at 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203; (703) 524-8800.

²For more specific information regarding the CSA standards, contact CSA at 178 Rexdale Blvd. Rexdale, Ontario, Canada M9W 1R3; (416) 747-4000.

³Air Conditioning Contractors of America, 1513 16th St., NW. Washington, DC 20036; (202) 483-9370.

1. Partner may begin to qualify models for Phase 1, pursuant to Table 1 of section IV.B. below, upon signing this agreement. The Phase 1 specification will remain in force until a date to be determined.
 2. The second phase of the program shall commence on a date to be determined, though Partner may choose, at its discretion, to implement the new terms prior to this date.
- C. Both parties agree that this agreement can be terminated by EPA ENERGY STAR Partner or EPA at any time, and for any reason, with no penalty. However, both parties agree that termination for noncompliance would only occur in accordance with the procedures of Section VII., below.

IV. EPA ENERGY STAR Partner's Responsibilities

A. EPA ENERGY STAR® Partner agrees to appoint a responsible representative of the company as liaison with EPA for the EPA ENERGY STAR Program and to notify EPA within one month of any change in liaison responsibility. (See Attachment A)

B. Product Qualification for the EPA ENERGY STAR® Logo

1. Technical specifications: EPA ENERGY STAR Partner will introduce one or more specific models of Geothermal Heat Pumps that meet the specifications presented in Tables 1 and 2 below.

Table 1: Phase 1 Technical Specifications ⁴

Product Type	EER	COP	Water Heating
Closed/Open Loop	13	2.8	YES
w/integrated WH	13	2.8	N/A
DX	13	3.1	YES
w/ integrated WH	13	3.1	N/A

⁴Specifications in these tables apply to single speed models. Multi-speed models may be qualified based on $EER = (\text{high speed EER} + \text{low speed EER})/2$; and $COP = (\text{high speed COP} + \text{low speed COP})/2$

Table 2: Phase 2 Technical Specifications (after a date TBD)

Product Type	EER	COP	Water Heating
Closed/Open Loop	16	3.4	YES
w/ integrated WH	14	3	N/A
DX	16	3.7	YES
w/ integrated WH	14	3.3	N/A

2. Warranty

a. Equipment

Partner shall provide a manufacturer limited warranty for its ENERGY STAR® compliant geothermal heat pump models. The geothermal heat pump shall be warranted for parts and labor for a minimum of two years. The major refrigeration components, including the compressor(s), heat exchanger(s), air coil(s), expansion and reversing valve(s) shall be warranted for parts and labor for a minimum of five years.

b. Ground Heat Exchanger

Since the performance of the geothermal heat pump is significantly related to the design and installation of the ground heat exchanger, Partner shall strive to ensure that the customer receives warranty protection for the integrity and performance of the ground heat exchanger for at least two years. Partner shall inform all distributors and dealers of ENERGY STAR geothermal heat pumps of the need for warranty protection for the customer. Partner shall focus its ENERGY STAR marketing efforts in regions where contractors provide customer warranties.

c. Testing

Partner agrees to perform energy-efficiency tests, or have tests performed by outside testing labs, as necessary, to determine which products comply. Based on the results of these tests, Partner shall self-certify those products that it determines are compliant with the specifications outlined above. Partner may submit information to EPA on compliant products on a voluntary basis.

1. Closed Loop Systems

Closed loop systems shall qualify under rating conditions in accordance with ARI 330-93.

2. Open Loop Systems

Open loop systems may qualify under rating conditions in accordance with ARI 325-93 using 70°F incoming water temperature for cooling and 50°F incoming water temperature for heating or may qualify under rating conditions in accordance with ARI 330-93.

3. DX Systems

DX systems shall qualify under rating conditions in accordance with CSA C748-94.

D. Training

1. Partner agrees that the proper installation of ENERGY STAR compliant geothermal heat pump equipment is important. Therefore, Partner shall ensure that training is offered to contractors on at least the following issues:

- 1) proper equipment installation and hookup,
- 2) domestic water heater connection for desuperheater or integrated water heating,
- 3) code compliance.

2. Partner agrees that proper sizing of heat pump equipment is important to ensure optimal operational cycles and comfort. Partner agrees to offer training to distributors or contractors on the proper use of the Manual J calculation, or other equivalent calculation, in order to encourage proper sizing of equipment. Training may be provided by Partner or a well regarded training program such as ACCA's, and Partner shall encourage distributors and contractors to take advantage of this or other relevant training opportunities.

3. Partner agrees that the performance of the heat pump is substantially affected by the design and installation of the ground heat exchanger. Partner shall strive to use contractors or well installers who have received training. Training may be provided by Partner or a well regarded training program such as the International Ground Source Heat Pump Association's. Partner shall focus its ENERGY STAR marketing efforts in regions where contractors have received training.

E. Customer Education

1. Product Literature:

Partner shall provide general information to users regarding the quality and energy efficiency benefits of the ENERGY STAR geothermal heat pump. This information might include a description of the ENERGY STAR Program and a discussion of the savings associated with using the geothermal heat pump. Partner may determine the best manner through which to disseminate this general information to users. Examples of acceptable approaches include: user's manual, special brochures included with qualified models, sales literature, maintenance information, etc.. Brochures and advertisements shall be worded to avoid misleading interpretations.

2. Logo Usage:

Partner shall read and abide by the attached logo use guidelines. Should EPA make changes to the logo use guidelines, Partner shall implement those changes as soon as practical after being notified by EPA of those changes.

F. At EPA's request Partner agrees to attempt to locate customers who have profited from the program and are willing to share information about performance and savings, as well as to locate employees who have contributed to its success. This customer- or employee-supplied information is to be without reference to or endorsement of specific Partner, specific products, or other supply sources.

G. EPA ENERGY STAR Partner agrees to provide information about the ENERGY STAR Program to all of its employees whose jobs are relevant to the development, marketing, sales, and service of ENERGY STAR[®]-labeled models.

H. EPA ENERGY STAR Partner understands that participation in the EPA ENERGY STAR Program does not constitute EPA endorsement of ENERGY STAR Partner or its products.

V. EPA's Responsibilities

A. EPA agrees to designate a single liaison point for the EPA ENERGY STAR Program, and to notify Partner within one month of any change in liaison responsibilities. Please send signed MOU and other correspondence to this person. (See Attachment)

B. EPA agrees to accept the test data as submitted by Partner, whether it is self-determined or determined by an independent third party. EPA will not officially approve any individual test reports voluntarily submitted by Partner. Therefore, Partner shall not include misleading statements in product literature that imply a product is approved or certified by the EPA, i.e., Partner shall not make claims such as "this geothermal heat pump is EPA approved," or "this geothermal heat pump is EPA certified." While this is a self-certifying process, EPA reserves the right to conduct tests on models bearing the EPA ENERGY STAR logo from either the open market or other available sources, or voluntarily received from Partner.

C. EPA agrees to make an effort to encourage consumer acceptance of models introduced under this agreement and bearing the EPA ENERGY STAR logo.

D. EPA agrees to provide Partner with recognition for its public service in protecting the environment by performing analyses about the pollution prevented by corporate participants, and providing this and other program information to appropriate news media sources for publication.

E. EPA agrees to promote energy-efficient equipment, and to inform consumers about the EPA ENERGY STAR Program and EPA ENERGY STAR logo by writing articles and/or cooperating with the news media by sharing information, where appropriate.

F. EPA agrees to work with Partner independently and/or in conjunction with other Partners to coordinate the placement of advertisements to promote energy-efficient equipment, educate consumers about the EPA ENERGY STAR Program and logo, and provide Partner with due recognition for its public service in protecting the environment.

VI. Use of the EPA ENERGY STAR® Logo

A. Partner shall read and abide by the attached logo use guidelines. Should EPA make changes to the logo use guidelines, Partner shall implement those changes as soon as practical after being notified by EPA of those changes.

VII. Conflict Resolution

A. Each party agrees to exercise good faith as a general principle for resolving conflicts under the EPA ENERGY STAR Program.

B. Both parties agree to informally notify each other if any problems or issues arise and to work together to provide maximum public confidence in the program.

C. Procedure for Addressing Noncompliant Products.

1. If EPA receives information that one or more models certified by Partner as ENERGY STAR® compliant may not meet all of the conditions of this MOU, then EPA will immediately notify Partner and attempt to address and resolve the problem informally.

2. If these informal discussions do not produce a mutually agreeable resolution, EPA shall notify Partner in writing that Partner shall be terminated from the program unless it undertakes the specific corrective actions sought by EPA. Partner agrees to reply to EPA in writing within 20 business days of receiving EPA's letter. At that time, Partner shall agree to do one of the following: (a) undertake in a timely and effective manner, the corrective actions sought by EPA; or (b) voluntarily terminate this agreement. If Partner does not respond to EPA's letter within 20 business days, or does not agree to either (a) or (b), then this agreement is terminated.

D. If EPA ENERGY STAR Partner believes that EPA is not meeting all of its commitments, Partner agrees to formally notify EPA in writing. EPA agrees to respond in writing within 20 business days of receiving ENERGY STAR Partner's letter. At that time, EPA will do one of the following: (a) undertake the corrective actions sought by Partner, or (b) explain why such corrective actions cannot be undertaken.

VIII. Freedom of Information Act and Confidential Business Information

Both parties understand that information provided by Partner to EPA will be treated in accordance with EPA's public information regulations under 40 Code of Federal Regulations, Part Two.

* * * * *

As representatives of EPA and *Geothermal Heat Pump Manufacturer*, we, the undersigned, do hereby execute this Memorandum of Understanding on the latter of the dates indicated below.

For the U.S. Environmental Protection Agency (EPA):

Signature: _____ Date: _____

Name: Paul Stolpman

Title: Director, Office of Atmospheric Programs

For:(Company Name):

Signature: _____ Date: _____

Name: _____

Title: _____

ATTACHMENT

Please complete and return with the signed Memorandum of Understanding.

EPA Contact:

Mailing Address:

Peter Banwell
Manager, ENERGY STAR® HVAC Program
US EPA (MC: 6202N)
401 M Street, SW
Washington, DC 20460

Overnight Delivery Address:

Peter Banwell
Manager, ENERGY STAR® HVAC Program
US EPA (MC: 6202N)
800 N. Capitol Street, Suite 580
Washington, DC 20002
Telephone: 202-564-9408
FAX: 202-565-6674

(Company Name) Contact:

Primary Contact (to receive all administrative materials):

Name:
Title:
Company:
Address:
City, State, Zip:
Telephone:
Fax:
E-mail:
Location of US Headquarters:

Marketing/PR Contact (to receive all promotional/marketing materials and information):

Name:
Title:
Company:
Address:
City, State, Zip:
Telephone:
Fax:
E-mail:

Switchboard Number or Sales Number (to be given to public for further information on all products):

Telephone Number:
Fax:
Internet URL: