

eBuilt™

Resource Guide



eBuilt™ Resource Guide

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OVERVIEW

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Dear Retail Partner,

Our purpose at Clayton® is Opening doors to a better life through attainable home ownership, but home price is just one part of ownership costs. Home energy expenses continue to rise, and in 2021, homeowners paid nearly 15% more for electricity versus the year before - that's double the rate of inflation.

These are real dollars from our customers' wallets, and this extra burden is what we call "the hidden mortgage." Imagine a homeowner whose power bills costs \$200 a month. Over 30 years, the cost of utilities may be as much or more than the cost of the home itself.

But what if Clayton homeowners could cut their power bill in half? Instead of paying \$200 a month, they kept \$100 of that in their pockets. And over 30 years, those savings added up to \$35,000. Think about it - what could they do with that money? Pay for their children's college. Save for retirement. Build true wealth. And simply because the home they live in is more energy efficient.

That's why we're so excited about our new housing initiative: eBuilt™ homes - the highest-performing, most energy-efficient home we've ever built. Built to the Department of Energy's Zero Energy Ready Home™ standards, eBuilt™ homes can save homeowners between 40 - 50% annually on their utility bills.¹ And they're built to add a ground-based renewable solar energy system for even more savings if the homeowner chooses to add after purchase.

While building to these new standards costs more, we're offering homeowners the most energy-efficient home we've ever built - at no additional cost in most areas - by offsetting increased construction costs through tax incentives.

Building energy efficient homes is the right thing to do for our homeowners, environment, and our industry. It gives us an opportunity to be more relevant in single family housing. We can change the perception of being the least energy-efficient home to the reality of being the most energy-efficient home available. What a great opportunity we have!

In addition to the support your Customer Success Managers will provide you, we've created this eBuilt™ resource guide with answers to frequently asked questions and information about technical specifications. This guide also provides an overview of new point-of-sale materials to support your sales efforts, including new homeowner videos and eBuilt™-branded downloadable content to post on your social channels.

We're excited to usher in this change with you and look forward to your partnership in making home ownership more attainable than ever with energy-efficient eBuilt™ homes.

Best regards,

A handwritten signature in black ink, appearing to read 'DW', with a stylized flourish at the end.

Donie Wood
Chief Customer Officer
Clayton Home Building Group

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf

eBuilt™ Retailer Frequently Asked Questions

What is an eBuilt™ Home?

An eBuilt™ home is built to the US Department of Energy's Zero Energy Ready Home™ manufactured home standards. High-performing and energy efficient, it is built to add a ground-based renewable solar energy system if homeowners choose to do so after purchase.

How much can eBuilt™ homes save on power bills?

eBuilt™ homes are incredibly energy efficient, even meeting and exceeding ENERGY STAR® standards.¹ Compared to traditional manufactured homes, eBuilt™ homes can reduce annual utility bills on average by 40-50%.²

If combined with a renewable energy source like solar panels, the home can theoretically offset up to 100% of its annual energy use, meaning it generates the power it consumes. This is referred to as a “net zero” home.

If homeowners install solar panels, does that mean they won't have a power bill again?

Even when solar panels are added, this does not necessarily mean the homeowner will not have a power bill in the future. Considerations like climate, the location of the solar panels and local utility fees will impact a homeowner's power bill, even with solar panels installed.

How do homeowners install solar panels after purchase?

The US Department of Energy provides a helpful homeowner's guide to going solar that you can refer them to: www.energy.gov/eere/solar/homeowners-guide-going-solar.

Clayton recommends a ground-based installation for solar panels. This provides several benefits:

Ground installation allows the homeowner to place solar panels in the most ideal location on their property without negatively influencing the direction in which the home faces.

Improper roof installation from a third-party solar vendor could potentially damage the roof, which would not be covered by the home warranty.

What makes eBuilt™ homes so energy efficient?

eBuilt™ homes are built with energy-efficient features such as argon gas low-E windows, insulated exterior doors, extra insulation, and ENERGY STAR® appliances, including a SmartComfort® by Carrier® heat pump HVAC or gas furnace and a Rheem® hybrid heat pump water heater.

How do air source heat pumps work?

Traditional furnaces and hot water heaters require a constant heat source to create warm or cold air and hot water. Air source heat pumps, on the other hand, extract heat from the air and use a compressor and refrigerant to generate heat. This conversion process is highly energy efficient, using half as much energy on average as other electric home-heating and cooling sources.³

How does a heat pump keep homes cool during summer and warm during the winter?

Heat pumps provide both heating and cooling by moving heat into the home during cold weather, then reversing the process to move heat and humidity outside the home during warmer weather.

For homes with an electric heat pump, will I need to install a separate air conditioner?

No, a heat pump has an air conditioning system that works the same as any traditional air conditioning unit.

I am in a warmer climate. What if the heat pump doesn't get my customers' homes cool enough?

The air conditioning component on a heat pump works the same as any other air conditioning unit. The idea that a heat pump won't cool as well as traditional air conditioning is a misconception. The advantage to a heat pump is that while it cools, it also regulates the humidity in a home, making the home more comfortable and reducing the need to blast cold air.

eBuilt™ Retailer Frequently Asked Questions

Do heat pumps work well in cold weather climates?

A heat pump will keep homes comfortably warm in the winter. The SmartComfort® by Carrier® heat pump serves as the primary source of heating and uses a built-in supplemental heating source, called auxiliary heat, if needed. Today's modern heat pumps can efficiently extract warmth from air temperatures as low as 10 degrees, although most installers will set the auxiliary heat to come on well before the temperature gets that low.

How is the size of the heat pump chosen for eBuilt™ homes?

With heat pumps, gone is the traditional rule of thumb that sizes an HVAC based on the square footage of the home. Right-sizing of the heat pump is guided by Wrightsoft® HVAC software and aligns with Air Conditioning Contractors of America® (ACCA) guidance.

Each heat pump is specifically sized based on the home's square footage, tight thermal envelope and climate. If a local HVAC contractor or retailer disagrees with the heat pump size, we ask they provide us with a Manual J and S design package to help resolve the problem.

If there is a customer complaint after the heat pump is installed, Clayton Engineering will provide a tailored HVAC tech evaluation form to collect specific performance measurements from the equipment for problem resolution.

What does “dehumidifier ready” mean? Do homeowners need to run a dehumidifier with a heat pump?

Heat pumps dehumidify the air as it cools, so they do not require a dehumidifier. In some climate areas with increased humidity,⁴ homes may include a designated dehumidifier area with a built-in drain for easy installation if homeowners choose to add one after purchasing the home.

What are the recovery times on Rheem®

hybrid hot water heaters?

Recovery times on water heaters are measured by First Hour Rating (FHR), meaning how much hot water it can produce in an hour. The Rheem® hybrid water heater installed in an eBuilt™ home has an FHR of 60 gallons for a 40-gallon water heater, and 67 gallons for a 50-gallon water heater (versus a traditional electric water heater which has FHRs of 53 and 55 gallons for 40- and 50-gallon water heaters, respectively).

Gas water heaters have virtually the same recovery time as a Rheem® hybrid water heater. It should also be noted, these recovery times are based on the out-of-the-box, recommended Energy Saver mode.

Are heat pump water heaters noisy?

Rheem® hybrid heat pump water heaters have a sound rating of 49 decibels, which is similar to a refrigerator.⁵

Can homebuyers order an all-gas home?

A homebuyer can order gas appliances (where available) for their stove, furnace and dryer. To qualify as eBuilt™, a home with gas utilities must have an electric Rheem® hybrid heat pump water heater.

How will homeowners learn to operate the new equipment that comes with their eBuilt™ home?

We have created home maintenance videos for homeowners, accessible by scanning the QR codes on the eBuilt™ homeowner video library flyer located in their home warranty pack.

Sources

¹ ENERGY STAR is a registered trademark owned by the U.S. Environmental Protection Agency.

² <https://www.energy.gov/sites/prod/files/2014/10/f18/ZERH%20Logo%20Use%20Guidelines.pdf>

³ <https://www.energy.gov/energysaver/heat-pump-systems>

⁴ <https://www.manufacturedhousing.org/thermal-map/>

⁵ <https://ehs.yale.edu/sites/default/files/files/decibel-level-chart.pdf>

[FOR REFERENCE ONLY]

DOE ZERO ENERGY READY HOMES

ADDENDUM TO RETAILER SALES AND SERVICE AGREEMENT

In addition to the terms and conditions set forth in the applicable Retailer Sales and Service Agreement, the undersigned Retailer acknowledges and agrees as follows with respect to the Department of Energy Zero Energy Ready Homes™ certified manufactured homes purchased from any Clayton home building facility.

1. Retailer must set all DOE Zero Energy Ready Homes in compliance with the Field Installed Measures detailed in the current U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements.
2. Retailer agrees to provide and install an electric heat pump when an electric DOE Zero Energy Ready Home is set.
3. Retailer must submit warranty card information and any serial numbers, and proof of heat pump purchase required for home certification to Clayton within 60 days of the home being occupied.
4. Retailer should register with the Department of Energy as a DOE Zero Energy Ready Home partner.
<https://www.energy.gov/eere/buildings/partner-central>
5. If Retailer will utilize DOE Zero Energy Ready Homes logos and marketing materials, it must comply with Department of Energy's Guidelines for Correctly Using the DOE Zero Energy Ready Home Name and Logo.
6. DOE Zero Energy Ready Homes are designed to accommodate the wiring for a renewable energy system. If Retailer or the customer adds a renewable energy system, it may void the Clayton warranty on the roof or other home components if compromised by the installation.

BY RETAILER:

Name of Retailer

Print Name & Title of Authorized Signatory

Signature of Authorized Signatory

Date

BY MANUFACTURER(S):

Name of Manufacturer(s)

Print Name of Authorized Signatory

Signature of Authorized Signatory

Date

DOE Zero Energy Ready Home Addendum to Retailer Sales and Service Agreement

It's Easy to Become an Authorized Clayton eBuilt™ Retail Partner!

✓ Step 1

Sign the Clayton Retailer Sales and Services Agreement Addendum.

✓ Step 2

Register with the US Department of Energy as a Zero Energy Ready Home™ partner by visiting <https://www.energy.gov/eere/buildings/partner-central> or scanning this QR code.



✓ Step 3

You will receive this Authorized Clayton eBuilt™ Retail Partner decal in the mail.

✓ Step 4

Place decal in your home center's front window to show your designation as an eBuilt™ retail partner!





**Receive a
\$500 rebate
when you install
an electric heat pump
in a Clayton eBuilt™
home!**

Rebate only available on new eBuilt™ homes certified as a DOE Zero Energy Ready Home™ that require an electric HVAC heat pump to be installed by Retailer. Rebate applies to orders placed on or before December 31, 2023.

To receive the rebate, Retailer must provide the Clayton Home Building® facility the warranty card for the home and proof of heat pump purchase to satisfy the DOE Zero Energy Ready Home program requirements by December 31, 2024.

Rebate is not available on eBuilt homes with a gas furnace.

Rebate will be initiated and paid to Retailer in accordance with timeline specified in the "Facility Specific Rebate Schedule" on file with the home building facility.

HOME SPECIFICATIONS

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The map illustrates the division of the United States into three zones, each represented by a different color. Zone 1 is green, Zone 2 is blue, and Zone 3 is light blue. The states are labeled with their abbreviations.

Zone 1 (Green): TX, LA, MS, AL, GA, FL.

Zone 2 (Blue): CA, AZ, NM, OK, KS, MO, TN, KY, NC, VA, WV, PA, NJ, DE, MD, NY, VT, ME, MA, RI, CT.

Zone 3 (Light Blue): WA, OR, ID, MT, ND, SD, NE, WY, CO, UT, NV, WA, MN, IA, IL, IN, OH, MI, WA, WV, PA, NJ, DE, MD, NY, VT, ME, MA, RI, CT.

Alaska (AK) and Hawaii (HI) are also shown.

eBuilt™ Home Standards

**eBuilt™ homes are built to specific thermal zone requirements
as part of the US Department of Energy's Zero Energy Ready Home™ program.**

ZONE 1	ZONE 2	ZONE 3
DOE upgraded insulation	DOE upgraded insulation	DOE upgraded insulation
Higher level of insulation installation and limited compression in wall cavities	Higher level of insulation installation and limited compression in wall cavities	Higher level of insulation installation and limited compression in wall cavities
Rheem® hybrid heat pump water heater	Rheem® hybrid heat pump water heater	Rheem® hybrid heat pump water heater
SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace	SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace	SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace
ecobee® smart thermostat	ecobee® smart thermostat	ecobee® smart thermostat
Additional space in panel box for double pole breaker for solar equipment	Additional space in panel box for double pole breaker for solar equipment	Additional space in panel box for double pole breaker for solar equipment
One-inch electrical conduit installed from below the home to panel box for solar wiring	One-inch electrical conduit installed from below the home to panel box for solar wiring	One-inch electrical conduit installed from below the home to panel box for solar wiring
Argon gas low-e windows	Argon gas low-e windows	Argon gas low-e windows
Insulated exterior doors	Insulated exterior doors	Insulated exterior doors
ENERGY STAR® rated dishwasher and refrigerator (if ordered)*	ENERGY STAR® rated dishwasher and refrigerator (if ordered)	ENERGY STAR® rated dishwasher and refrigerator (if ordered)
Whole house ventilation fan	Whole house ventilation fan	Whole house ventilation fan
100% LED bulbs/fixtures	100% LED bulbs/fixtures	100% LED bulbs/fixtures
All HVAC register openings sealed to floor decking	All HVAC register openings sealed to floor decking	All HVAC register openings sealed to floor decking
All plumbing and electrical penetrations through the floor and ceiling are air sealed	All plumbing and electrical penetrations through the floor and ceiling are air sealed	All plumbing and electrical penetrations through the floor and ceiling are air sealed
All joints and seams between exterior floors, walls, and roof system are air sealed	All joints and seams between exterior floors, walls, and roof system are air sealed	All joints and seams between exterior floors, walls, and roof system are air sealed
Bottom board air sealed to floor perimeter rail	Bottom board air sealed to floor perimeter rail	Bottom board air sealed to floor perimeter rail
Recessed lighting and smoke detectors sealed to ceiling board	Recessed lighting and smoke detectors sealed to ceiling board	Recessed lighting and smoke detectors sealed to ceiling board
Windows air-sealed to exterior sheathing	Windows air-sealed to exterior sheathing	Windows air-sealed to exterior sheathing
Flashing installed around windows and exterior doors	Flashing installed around windows and exterior doors	Flashing installed around windows and exterior doors
Recessed lighting fixtures are IC AT-rated	Recessed lighting fixtures are IC AT-rated	Recessed lighting fixtures are IC AT-rated
Higher roof truss heel height	Higher roof truss heel height	Higher roof truss heel height
Attic baffles	Attic baffles	Attic baffles
Self-adhering bituminous membrane at eaves, valleys and roof penetrations	Self-adhering bituminous membrane at eaves, valleys and roof penetrations	Self-adhering bituminous membrane at eaves, valleys and roof penetrations
Kick out flashing	Kick out flashing	Kick out flashing
Dehumidifier drain installed	Dehumidifier drain installed (optional)	Dehumidifier drain installed (optional)

* ENERGY STAR is a registered trademark owned by the U.S. Environmental Protection Agency.



eBuilt Home Standards

TRU eBuilt™ homes are built to specific thermal zone requirements as part of the US Department of Energy's Zero Energy Ready Home™ program.

ZONE 1	ZONE 2	ZONE 3
DOE upgraded insulation	DOE upgraded insulation	DOE upgraded insulation
Higher level of insulation installation and limited compression in wall cavities	Higher level of insulation installation and limited compression in wall cavities	Higher level of insulation installation and limited compression in wall cavities
Rheem® hybrid heat pump water heater	Rheem® hybrid heat pump water heater	Rheem® hybrid heat pump water heater
SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace	SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace	SmartComfort® by Carrier high efficiency HVAC electric heat pump installed by retail partner or gas furnace
ecobee® smart thermostat	ecobee® smart thermostat	ecobee® smart thermostat
Additional space in panel box for double pole breaker for solar equipment	Additional space in panel box for double pole breaker for solar equipment	Additional space in panel box for double pole breaker for solar equipment
One-inch electrical conduit installed from below the home to panel box for solar wiring	One-inch electrical conduit installed from below the home to panel box for solar wiring	One-inch electrical conduit installed from below the home to panel box for solar wiring
Argon gas low-e windows	Argon gas low-e windows	Argon gas low-e windows
Insulated exterior doors	Insulated exterior doors	Insulated exterior doors
ENERGY STAR® rated dishwasher and refrigerator (if ordered)*	ENERGY STAR® rated dishwasher and refrigerator (if ordered)	ENERGY STAR® rated dishwasher and refrigerator (if ordered)
Whole house ventilation fan	Whole house ventilation fan	Whole house ventilation fan
100% LED bulbs/fixtures	100% LED bulbs/fixtures	100% LED bulbs/fixtures
All HVAC register openings sealed to floor decking	All HVAC register openings sealed to floor decking	All HVAC register openings sealed to floor decking
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Bottom board air sealed to floor perimeter rail	Bottom board air sealed to floor perimeter rail	Bottom board air sealed to floor perimeter rail
Recessed lighting and smoke detectors sealed to ceiling board	Recessed lighting and smoke detectors sealed to ceiling board	Recessed lighting and smoke detectors sealed to ceiling board
Windows air-sealed to exterior sheathing	Windows air-sealed to exterior sheathing	Windows air-sealed to exterior sheathing
Flashing installed around windows and exterior doors	Flashing installed around windows and exterior doors	Flashing installed around windows and exterior doors
Recessed lighting fixtures are IC AT-rated	Recessed lighting fixtures are IC AT-rated	Recessed lighting fixtures are IC AT-rated
Higher roof truss heel height	Higher roof truss heel height	Higher roof truss heel height
Attic baffles	Attic baffles	Attic baffles
Self-adhering bituminous membrane at eaves, valleys and roof penetrations	Self-adhering bituminous membrane at eaves, valleys and roof penetrations	Self-adhering bituminous membrane at eaves, valleys and roof penetrations
Kick out flashing	Kick out flashing	Kick out flashing
Dehumidifier drain installed	Dehumidifier drain installed	Dehumidifier drain installed
		2" x 6" sidewalls (optional)

* ENERGY STAR is a registered trademark owned by the U.S. Environmental Protection Agency.

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Model Manufacturer's Installation Manual

Zero Energy Ready Home Requirements

Introduction

This is an Addendum to the Manufacturer's Installation Manual (MIM) providing instructions for the certification of Zero Energy Ready Home Manufactured Homes. This Addendum can be incorporated into the plant's MIM. Installers should be advised to read all the instructions that may apply to the specific home prior to commencing site work and home installation.

See Table 1 for requirements for different foundation types.

Table 1 Requirements for different foundation types

Foundation type	Requirements
Raised pier¹	3.1, 4.1, 4.2, 4.3, 5.1
Sealed-crawlspace²	1.1, 1.3, 1.4, 1.5, 1.6, 1.7, 2.1, 3.1, 4.1, 4.2, 4.3, 5.1
Basement³	1.1, 1.2, 1.4, 1.5, 1.6, 1.7, 1.8, 2.1, 3.1, 4.1, 4.2, 4.3, 5.1

Notes:

¹ A raised pier foundation, also called a vented crawlspace, is at or near grade level. It may or may not have a concrete slab. It is vented.

² A sealed-crawlspace foundation is defined as a sealed space enclosed by perimeter walls such as concrete block walls on concrete footings. It is not an occupiable space. It may have poured concrete footers and the ground may be excavated.

³ A basement foundation is defined as an occupiable space below grade.

1 Foundation systems

1.1 Sealing and conditioning of basements or sealed crawlspace

Insulate, seal and condition basements or sealed crawlspace as follows:

- a. Insulate basement or sealed-crawlspace perimeter walls with minimum R-5 insulation; and,
- b. Seal all penetrations and joints (full length) between materials on basement or sealed-crawlspace perimeter walls with a moisture-proof sealant to prevent outside air infiltration; and,
- c. Condition the basement or sealed crawlspace in one of two methods, depending on the provisions provided by the manufacturing plant:
 - Extend the supply air duct from its marked location in the floor system and into the basement or sealed crawlspace. Securely fasten the duct termination so that it is suspended above head height. Seal the bottom barrier (if present) around the duct. Supply air to basement or sealed-crawlspace should be not less than 1 cfm per 50 sq. ft. of horizontal floor in the basement or sealed-crawlspace; or,
 - Install an exhaust fan rated for continuous operation to exhaust air from the basement

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- or sealed-crawlspace at a rate of 1 cfm per 50 sq. ft. of basement or sealed-crawlspace floor area. Connect the fan to power receptacle provided by home manufacturer for this purpose. This option not permissible in radon zone 1.

Exception: Not required in Dry (B) climates (see Attachment A, Figure A.1).

1.2 Capillary break beneath slabs (for homes with slab, except sealed-crawlspace slab or raised pier foundations)

Install capillary break beneath slabs as follows:

- Install a capillary break beneath slab foundations (for example, a basement slab) consisting of 4 inches of 1/2 in. diameter or greater clean aggregate stone; or, install a 4 inch uniform layer of sand, overlain with either a layer of geotextile drainage matting throughout or strips of geotextile drainage matting along the perimeter installed according to the manufacturer's instructions; and,
- Install a vapor barrier directly over the above consisting of either: ≥ 6 mil polyethylene sheeting lapped 6-12 in.; or, ≥ 1 in. extruded polystyrene insulation with taped joints.

Exceptions: Not required in Dry (B) climates (see Attachment A, Figure A.1). Not required in areas with free-draining soils – identified as Group 1 (see Attachment B, Table B.1) as verified by a certified hydrologist¹, soil scientist, or engineer through a site visit.

1.3 Capillary break at sealed crawlspace

Install capillary break at sealed-crawlspace as follows:

- Provide capillary break at sealed-crawlspace floors using ≥ 6 mil polyethylene sheeting lapped 6-12 in. Installed using one of the following:
 - Placed beneath a concrete slab; or, lapped up each wall or pier and fastened with furring strips or equivalent; or,
 - Secured in the ground at the perimeter using stakes.

Exceptions: Not required in Dry (B) climates (see Attachment A, Figure A.1). Not required in areas with free-draining soils – identified as Group 1 (see Attachment B, Table B.1) as verified by a certified hydrologist, soil scientist, or engineer through a site visit.

1.4 Drain tiles (for homes with basement or sealed crawlspace)

Install a drain system that meets **all** of the following requirements:

- Install drain pipe at basement and sealed-crawlspace walls, with the top of the drain pipe below the bottom of the concrete slab or sealed-crawlspace floor; and
- Lay the pipe with enough slope to drain to a non-perforated pipe that carries the collected water to outside grade (daylight) or to a sump pump; and

¹ For example, Professional Hydrologist certified by American Institute of Hydrology (AIH).

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- c. Lay the drain pipe, perforations down, in a gravel trench with at least 6 inches of ½-inch to ¾ inch washed gravel or stone above the pipe and at least 2 inches below; and
- d. Install landscape fabric under, around, and over the washed gravel.

1.5 Drain or sump pump and check valve (for homes with basement or sealed crawlspace)

Install a drain or sump pump in basement and sealed-crawlspace floors, discharging to daylight at least 10 ft. outside the foundation or into an approved sewer system. For homes in EPA Radon Zone 1 (see <https://www.epa.gov/radon/state-maps-radon-zones>), install a check valve.

1.6 Sump pump cover (for homes with basement or sealed crawlspace)

Select and install sump pumps that have tight-fitting lids with gaskets and mechanical fasteners.

1.7 Damp-proofing below-grade walls and sealed-crawlspace (for homes with basement or sealed-crawlspace)

Finish the exterior surface of below-grade walls of basements and unvented crawlspaces as follows:

- a. For poured concrete, masonry, and insulated concrete forms, finish with damp-proofing coating.
- b. For wood framed walls finish with polyethylene and adhesive or other equivalent waterproofing.

1.8 Vapor retarder at below grade wall (for homes with basement)

Do not install a Class I vapor retarder on the interior side of air permeable insulation in exterior below-grade walls. A Class I vapor retarder is defined as a material or assembly with a rating of ≤ 0.1 perm. The following materials are typically ≤ 0.1 perm and shall not be used on below-grade exterior walls in any climate: rubber membranes, polyethylene film, glass, aluminum foil, sheet metal, and foil-faced insulating / non-insulating sheathings. These materials can be used on the interior side of walls if air permeable insulation is not present (e.g., foil-faced rigid foam board adjacent to a below-grade concrete foundation wall is permitted).

2 Radon

2.1 Radon mitigation (for all homes in EPA Radon Zone 1 except raised pier foundation)

Check if the home is in EPA Radon Zone 1 (see <https://www.epa.gov/radon/state-maps-radon-zones>). If in EPA Radon Zone 1, install all the following radon-resistant features, except where noted:

- a. Install capillary break under slab and at crawlspace according to 1.2 or 1.3, as applicable.
Exception: In dry climates (see Attachment A, Figure A.1), a “pipe loop” in a trench of clean aggregate along the entire inside perimeter of the foundation (installed according to ANSI/AARST CCAH 403.1.1) can be used in lieu of a uniform layer of aggregate under the entire slab; and,

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- b. Install a 3 or 4 in. diameter gas-tight vertical vent pipe, clearly labeled as a component of a radon reduction system. Connect the vent pipe to an open T-fitting in the aggregate layer (or connect it to geotextile drainage matting according to the manufacturer's instructions) beneath the polyethylene sheeting referenced in 1.2 or 1.3, extending up through the conditioned spaces and terminating a minimum of 12 in. above the roof (see alternative in d below). Attach at least 10 ft. of horizontal perforated drain tile to the T-fitting beneath the polyethylene sheeting placed over earthen crawlspaces and below concrete slabs; and,
Note: Radon pipe suction points are not permitted on sump lids.
- c. Install a radon fan (i.e., an active system) or install the above-mentioned vent pipe near the provided attic electrical receptacle (i.e., a passive system) to facilitate future fan installation if needed (see alternative d below). Provide a space surrounding the radon pipe, having a vertical height of not less than 48 inches and a diameter of not less than 21 inches, in the attic area where the radon fan can be installed, if required; or,
- d. Utilize another exterior location or a garage that is not below conditioned space if the home has no accessible attic location for a fan per ANSI/AARST CCAH. Label the branch circuit supply at the electrical panel indicating its intended use; and,
- e. Air seal foundation with polyurethane caulk or the equivalent at all slab openings, penetrations and control or expansion joints.

3 Air Sealing

3.1 Sealing common walls (for attached homes)

In attached homes, seal the gap between the common wall (e.g., the drywall shaft wall) and the structural framing between units at all exterior boundaries.

4 HVAC

4.1 Outdoor packaged HVAC units

Install the following for homes with outdoor packaged unit:

- a. Use exterior ductwork with \geq R-8 insulation; and,
- b. Install outside duct runs less than 20 feet in length each for supply and return.

4.2 Garage HVAC equipment (for homes with a garage)

Do not place air-handling equipment or ductwork in a garage.

4.3 Ventilation before occupancy

Choose one of the following methods to comply:

- a. Ventilate the home with outside air at the highest rate and duration practical, during and shortly after installing products that are known sources of contaminants (e.g., cabinets, carpet padding and painting) before occupancy; or,

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- b. Advise the occupant to operate the ventilation system at the highest rate it can provide during the first few months of occupancy.

5 Water Management

5.1 Gutters and downspouts

Install gutters and downspouts as follows:

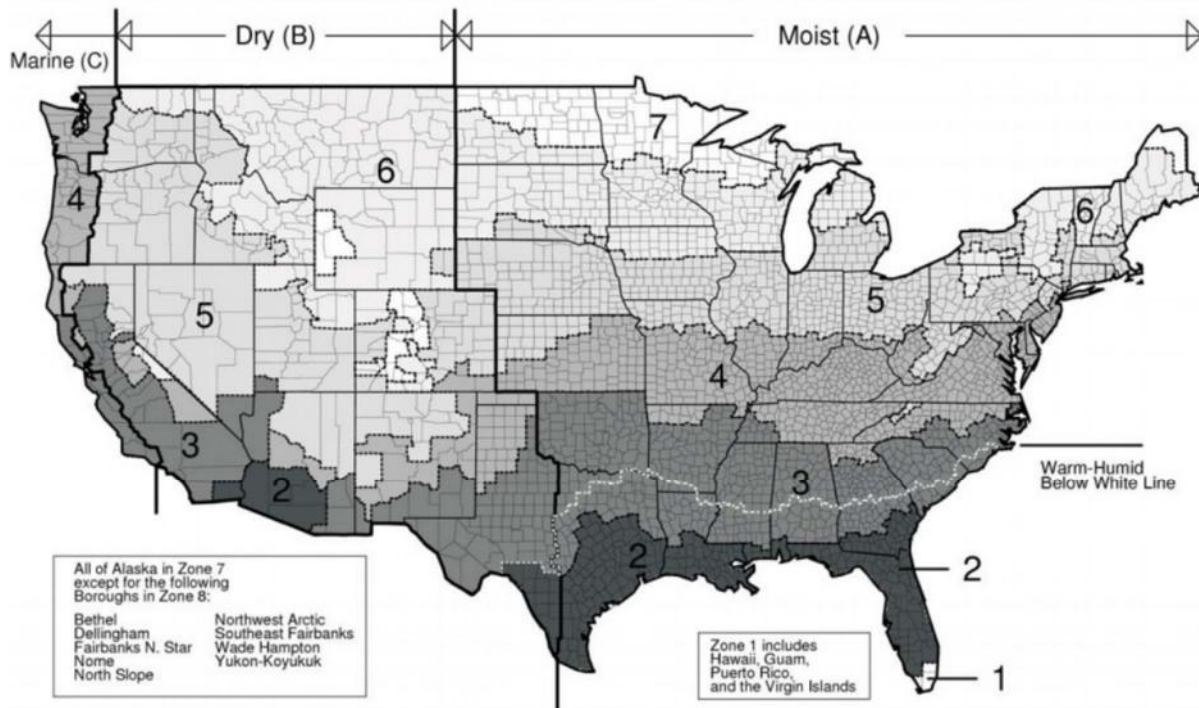
- a. For homes with slab on grade, sealed-crawlspace, or raised pier foundation without gutters:
 - Extend the foundation walls at least 16 in. above final grade; or,
 - Provide a drip line at eaves that is horizontally 16 in. away from the edge of the foundation wall; or,
 - Use cladding materials that are decay and rot resistant and can tolerate regular wetting extending at least 16 in. above final grade and install a well-sealed, continuous drainage plane per manufacturer's instructions.
- b. For homes with a basement:
 - Install adequately sized gutters and downspouts connected to piping that will carry the water to a sloping final grade ≥ 5 ft. from the foundation or to an underground catchment system ≥ 10 ft. from the foundation that is not connected to the foundation drain system.

Exceptions: Not required in Dry (B) climates (see Attachment A, Figure A.1). Not required in areas with free-draining soils – identified as Group 1 (see Attachment B, Table B.1) as verified by a certified hydrologist, soil scientist, or engineer through a site visit.

Clayton Home Building Group

Attachment A

Figure A.1 2009 IECC Climate zones. (source: 2009 IECC Figure 301.1)



To look up the climate zone for each County, check line here:

<https://codes.iccsafe.org/content/IECC2009/chapter-3-general-requirements>

Clayton Home Building Group

Attachment B

Table B.1 Properties of soils classified according to the unified soil classification system (source: 2015 IRC Table R405.1)

TABLE R405.1 PROPERTIES OF SOILS CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL GROUP	UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOL	SOIL DESCRIPTION	DRAINAGE CHARACTERISTICS ^a	FROST HEAVE POTENTIAL	VOLUME CHANGE POTENTIAL EXPANSION ^b
Group I	GW	Well-graded gravels, gravel sand mixtures, little or no fines	Good	Low	Low
	GP	Poorly graded gravels or gravel sand mixtures, little or no fines	Good	Low	Low
	SW	Well-graded sands, gravelly sands, little or no fines	Good	Low	Low
	SP	Poorly graded sands or gravelly sands, little or no fines	Good	Low	Low
	GM	Silty gravels, gravel-sand-silt mixtures	Good	Medium	Low
Group II	SM	Silty sand, sand-silt mixtures	Good	Medium	Low
	GC	Clayey gravels, gravel-sand-clay mixtures	Medium	Medium	Low
	SC	Clayey sands, sand-clay mixture	Medium	Medium	Low
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Medium	High	Low
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium	Medium	Medium to Low
Group III	CH	Inorganic clays of high plasticity, fat clays	Poor	Medium	High
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Poor	High	High
	OL	Organic silts and organic silty clays of low plasticity	Poor	Medium	Medium
Group IV	OH	Organic clays of medium to high plasticity, organic silts	Unsatisfactory	Medium	High
	Pt	Peat and other highly organic soils	Unsatisfactory	Medium	High

For SI: 1 inch = 25.4 mm.

a. The percolation rate for good drainage is over 4 inches per hour, medium drainage is 2 inches to 4 inches per hour, and poor is less than 2 inches per hour.

b. Soils with a low potential expansion typically have a plasticity index (PI) of 0 to 15, soils with a medium potential expansion have a PI of 10 to 35 and soils with a high potential expansion have a PI greater than 20.

Field Installation Measures for US Department of Energy's ZERO ENERGY READY HOME™ Manufactured Home national requirements.

All documentation is in the **Manufacturer's Installation Manual (MIM)**.

ENVELOPE AND FOUNDATION SYSTEM

- ☐ **Radon mitigation** All the following radon-resistant features must be installed in homes in EPA Radon Zone 1 (see www.epa.gov/radon/zonemap.html), except where noted. **Homes with raised pier foundation are exempt from the radon mitigation requirement.**
- ☐ **Sealing common walls** In attached homes, gaps between units must be sealed at all exterior boundaries to form a continuous air barrier separating conditioned from unconditioned spaces.

HVAC AND ELECTRIC SYSTEM

- ☐ **Outdoor packaged HVAC units** Outdoor package units are allowed but such systems must:
 - a. be a heat pump; AND
 - b. have outside duct runs that are less than 20 feet in length each for supply and return; and, have exterior ducts wrapped with \geq R-8 insulation.
- ☐ **Garage HVAC equipment** Air-handling equipment or ductwork cannot be placed in a garage.
- ☐ **Ventilation before occupancy** Home must be ventilated before occupancy.
 Ventilate the home with outside air at the highest rate and duration practical, meeting ventilation requirements for outdoor air flow and humidity control:
 During and shortly after installing products that are known sources of contaminants (e.g., cabinets, carpet padding and painting), AND
 During the period between finishing and occupancy.
If whole house ventilation cannot be scheduled prior to occupancy, advise the buyer to operate the ventilation system at the highest rate it can provide during the first few months of occupancy, meeting the above requirements.

WATER MANAGEMENT AND MOISTURE CONTROL

- ☐ **For expansive or collapsible soils** For homes with a basement on expansive or collapsible soils, gutters and downspouts must be provided that empty to lateral piping that discharges water on sloping final grade \geq 5 ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water \geq 10 ft. from foundation.



Field Installation Measures for US Department of Energy's ZERO ENERGY READY HOME™ Manufactured Home national requirements, continued.

- | | |
|--|---|
| <input type="checkbox"/> Capillary break beneath slabs | Provide capillary breaks beneath all slabs (e.g., slab on grade, basement slab), except crawlspace slabs , using either: ≥ 6 mil polyethylene sheeting lapped 6-12 in., or ≥ 1 in. extruded polystyrene insulation with taped joints. |
| <input type="checkbox"/> Capillary break at crawlspace | Provide capillary break at crawlspace floors, except raised pier foundation , using ≥ 6 mil polyethylene sheeting lapped 6-12 in. |
| <input type="checkbox"/> Below-grade walls and crawlspace | Exterior surface of below-grade walls of basements and unvented crawlspaces must be finished as follows:
a. For poured concrete, masonry, and insulated concrete forms: finished with damp-proofing coating.
b. For wood framed walls: finished with polyethylene and adhesive or other equivalent waterproofing. |
| <input type="checkbox"/> Vapor retarder at below grade wall | Class 1 vapor retarder must not be installed on interior side of air permeable insulation in exterior below-grade walls. |
| <input type="checkbox"/> Sump pump cover | Sump pump covers must be mechanically attached with full gasket seal or equivalent. |
| <input type="checkbox"/> Drain tiles | Drain tiles must be installed at basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. |
| <input type="checkbox"/> Drain or sump pump and check valve | Drain or sump pump must be installed in basements and crawlspaces. In EPA Radon Zone 1 (see www.epa.gov/radon/zonemap.html), check valve also must be installed. Not required for raised pier foundation. |
| <input type="checkbox"/> Below slab layer requirement | Layer of aggregate or sand (4 in.) with geotextile matting must be installed below slabs AND radon techniques must be used in EPA Radon Zone 1. Not required for raised pier foundation. |
| <input type="checkbox"/> Sealed basements/crawlspaces | Basements/crawlspaces must be insulated, sealed, and conditioned. Not required for raised pier foundation. |
| <input type="checkbox"/> Water splash damage protection | If gutters are not provided, homes must be protected from water splash damage using one of the below methods:
a. Extend the foundation walls at least 16 in. above final grade; OR
b. Provide a drip line at eaves that is horizontally 16 in. away from the edge of the foundation wall; OR
c. Use cladding materials that are decay and rot resistant and can tolerate regular wetting extending at least 16 in. above final grade and install a well-sealed, continuous drainage plane per manufacturer's instructions. |



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

Eligibility Requirements

Only manufactured homes¹ are eligible to be certified through the U.S. DOE Zero Energy Ready Home (ZERH) Manufactured Homes Pilot Program. To participate in the DOE ZERH program, manufactured homes must be certified under the ENERGY STAR Manufactured New Homes program. Site-built and modular single-family homes and multifamily buildings may not earn the DOE ZERH Manufactured Homes Certification but may be eligible for certification through applicable DOE ZERH Program requirements. For more information, visit <https://www.energy.gov/eere/buildings/doe-zero-energy-ready-home-zerh-program-requirements>

Partnership and Plant Certification Requirements

Manufactured housing plants must meet the following requirements prior to certifying homes to the DOE ZERH program:

- Register as a DOE ZERH Manufactured Home Plant Partner
- Complete a plant certification process through a recognized Quality Assurance Provider (QA Provider).² If a plant is de-certified by its QA Provider for any reason, it may not produce DOE ZERH certified manufactured homes and must immediately cease all use of the DOE ZERH name and logo.
- See the **DOE Zero Energy Ready Home Manufactured Homes Version 1: Certification, Enforcement, and Reporting Guide** for a complete description of certification and verification process requirements.

Manufactured Homes Certification Requirements³

All Certified DOE ZERH Manufactured Homes shall meet the following requirements:

- Exhibit 1: Mandatory Efficiency Requirements
- Exhibit 2: Additional Efficiency Requirements
- Exhibit 3: Mandatory Technical Requirements

Exhibit 1: Mandatory Efficiency Requirements

Climate Zone ⁴	1	2	3
Envelope & Glazing			
<ul style="list-style-type: none"> • Insulation and glazing U-factor levels shall comply with one of the following options: <ul style="list-style-type: none"> • Meet or exceed the following performance levels: 			
Wall Insulation	R-13	R-21	R-21
Floor Insulation	R-22	R-22	R-33
Ceiling Insulation	R-33	R-33	R-38
Door U-factor	0.40	0.40	0.30
Window U-factor	0.30	0.30	0.30
<ul style="list-style-type: none"> • OR achieve an overall coefficient of heat transmission⁵ (Uo) that does not exceed: 			
Single-section Uo	0.076	0.065	0.057
Multi-section Uo	0.070	0.063	0.054
<ul style="list-style-type: none"> • The solar heat gain coefficient of fenestration shall not exceed: ⁶ 			
SHGC	0.25	0.25	N/A
Thermostat & Ductwork			
<ul style="list-style-type: none"> • Programmable thermostat shall be installed. • Ducts in floor cavities shall be enclosed by floor insulation. • Crossover ducts, ducts in unconditioned attics, and other ducts in unconditioned space shall have at least R-8 duct insulation⁷ 			
Mandatory Setup Requirements			
<ul style="list-style-type: none"> • Marriage line seal: For multi-section homes only, the marriage line areas must be filled with a continuous, non-porous insulating gasket creating a permanent air barrier in the ceiling, walls, and floor. Acceptable gaskets can be one- or two-part systems, including proprietary gaskets, foams, insulation wrapped in poly and insulation covered by butyl or other long-life tape on one side. There should be no visible gaps or tears. The marriage line seal shall be installed at the plant and be protected against damage during shipping. • Duct Installation: For multi-section homes only, the crossover ducts must be installed such that all seams and joints are tightly sealed against leakage and the ducts do not rest on the ground. 			



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

Exhibit 2: Additional Efficiency Requirements

In addition to meeting the requirements in Exhibit 1, select one or more energy efficiency measure(s) to achieve a total of at least 18 (eighteen) points. Select from the applicable section based on the primary space heating system of the home to be certified. The second row represents the point value for mandatory measures from Exhibit 1, which may be counted towards the required total.

Energy Efficiency Measure		Point Value ⁸		
		CZ 1	CZ 2	CZ 3
Mandatory Requirements				
Certified ENERGY STAR Manufactured New Homes Version 3				
All Requirements in Exhibit 1		7.5	2.5	2
Optional Envelope Improvements				
Coefficient of heat transmission (Uo) ≤ 0.049 ⁶		12	9.5	4.5
Optional Heating and Cooling Equipment				
Heat Pump ⁹ ≥ 7.5 HSPF2 / 14.3 SEER2		9	13.5	17
Gas / propane Furnace ≥ 90 AFUE		2	2.5	5.5
Gas / propane Furnace ≥ 95 AFUE		2.5	3.5	7.5
Gas / Propane Furnace ≥ 96 AFUE		3	4	8.5
Optional Water Heater				
Gas / Propane Water Heater ≥ 0.93 UEF.		4.5	3.5	0.5
Heat Pump Water Heater ≥ 2.20 UEF	With electric furnace, electric strip, or electric baseboard primary space heating	6	5.5	1.5
Heat Pump Water Heater ≥ 3.30 UEF		7.5	7	1.5
Heat Pump Water Heater ≥ 2.20 UEF	With all other primary heating sources	9	10	7.5
Heat Pump Water Heater ≥ 3.30 UEF		11.5	13	9
Optional Lighting, Appliances, & Water Fixtures				
LED lighting installed in all permanently installed fixtures ¹⁰		0.5	0.5	0.5
Bathroom faucets ≤ 1.5 gallons per minute (gpm) and showerheads ≤ 2.0 gpm		0.5	0.5	0.5
ENERGY STAR certified refrigerator and dishwasher ¹¹		0.5	0.5	0.5
ENERGY STAR certified clothes washer ¹¹		0.5	0.5	0.5



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

Exhibit 3: Mandatory Technical Requirements

In addition to meeting the requirements in Exhibits 1 and 2, all requirements in Exhibit 3 must be met, including Factory Installed Measures and Field Installed Measures.

FACTORY INSTALLED MEASURES				
THERMAL ENVELOPE				
Measure	Technical Requirement	Documentation	Verification	Frequency
1 Reduced Thermal Bridging				
1.1 Roof truss heel height	For insulated ceilings with attic space above (i.e., non-cathedralized), the minimum roof truss heel height is 5.5 in.	Design Approval Primary Inspection Agency (DAPIA) / Quality Control Manual (QCM)	In-Plant Primary Inspection Agency (IPIA)	IPIA inspection
1.2 Insulation beneath attic platforms	Insulation beneath attic platforms (e.g., HVAC platforms, walkways) must be \geq R-21.	DAPIA/QCM	IPIA	IPIA inspection
1.3 Reduced wall thermal bridging	At above-grade walls separating conditioned from unconditioned space, one of the following options used (rim / band joists exempted): Option 1: Advanced framing ¹² Option 2: Extended plate and beam wall system. Option 3: Continuous rigid insulation, insulated siding, or combination of the two is: \geq R-3 in HUD climate zone 1 and 2; \geq R-5 in HUD climate zone 3.	DAPIA/QCM	IPIA	IPIA inspection
2 Air Sealing				
2.1 Sealing recessed lighting	Recessed lighting fixtures adjacent to unconditioned space must be ICAT (Insulation Contact Airtight) labeled and gasketed.	DAPIA/QCM	IPIA	IPIA inspection
2.2 Sealing exterior doors	Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions must be made substantially air-tight with weatherstripping or equivalent gasket.	DAPIA/QCM	IPIA	IPIA inspection
2.3 Sealing floor penetrations	All plumbing, electrical, and HVAC penetrations through the floor must be sealed at the floor, even where the floor is not serving as the air barrier.	DAPIA/QCM	IPIA	IPIA inspection



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

2.4 Sealing bottom board or belly board	In any installation where the bottom board or belly board is used as part of the air barrier, the perimeter and any seams in the bottom board or belly board must be sealed with caulk, foam, tape, gasket, or equivalent air sealing material.	DAPIA/QCM	IPIA	IPIA inspection
HVAC/AIR DISTRIBUTION SYSTEMS				
Measure	Technical Requirement	Documentation	Verification	Frequency
3 Mechanical Ventilation System Design				
3.1 Ventilation air flow rate	Mechanical ventilation airflow design rate and run-time meet the requirements of ASHRAE 62.2-2010, 2013, 2016, 2019 or 2022. A POS system can be installed but does not count toward meeting the requirement.	DAPIA/QCM	IPIA	IPIA inspection
3.2 Ventilation control	System has controls that allow automatic operation.	DAPIA/QCM	IPIA	IPIA inspection
3.3 Ventilation inlet	For outdoor air inlets designed to connect to a ducted HVAC system return, damper controls are provided that allow the airflow automatically to be restricted during ventilation off-cycle. (One option is the use of a spring-loaded backdraft damper that closes the inlet when the furnace fan is off.)	DAPIA/QCM	IPIA	IPIA inspection
3.4 Whole house ventilation fan sound level	Whole house ventilation fans must have a sound rating of ≤ 3 sones if operated intermittently and ≤ 1 sone if continuous. Fans used with HRVs or ERVs and in-line remote mounted fans are exempt from this requirement.	DAPIA/QCM	IPIA	IPIA inspection
3.5 Integrated vent controller	If the ventilation system controller operates the HVAC fan, then HVAC fan operation is intermittent and either the fan type for the air handler fan must be an ECM / ICM type or the controls set to reduce run-time by accounting for HVAC system heating or cooling hours.	DAPIA/QCM	IPIA	IPIA inspection
3.6 Bathroom ventilation fans	Bathroom fans, except HRV (Heat Recovery Ventilator) or ERV (Energy Recovery Ventilator) fans, must be ENERGY STAR certified.	DAPIA/QCM	IPIA	IPIA inspection
4 Duct Quality Installation				



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

4.1 Air handler location	The HVAC air handler must be located within the home's thermal boundary and air barrier. Outdoor package units are exempt from this requirement (see item 2.1 in the 2% Field Inspection Technical Requirement).	DAPIA/QCM	IPIA	IPIA inspection
4.2 Duct installation quality	Factory-installed ductwork must be installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork.	DAPIA/QCM	IPIA	IPIA inspection
4.3 Measured duct leakage	Leakage of factory-installed ducts must not exceed four (4) cubic feet per minute per 100 sq. ft. of conditioned floor area at a pressure differential of 0.1-inch w.g. (25 Pascals).	DAPIA/QCM	In-plant inspection and testing by trained plant personnel (INSP)	10%
5 Local Mechanical Exhaust				
5.1 Kitchen exhaust airflow rate	<p>For intermittently-operated fans (such as range hoods): airflow must achieve ≥ 100 CFM, and, if not integrated with range, the fan must achieve ≥ 5 ACH (Air Changes per Hour) based on kitchen volume.</p> <p>For continuously-operated fans: airflow must achieve ≥ 5 ACH based on kitchen volume with a minimum of 25 CFM.</p> <p>Kitchen volume shall be determined by drawing the smallest possible rectangle on the floor plan that encompasses all cabinets, pantries, islands, peninsulas, ranges / ovens, and the kitchen exhaust fan, and multiplying by the average ceiling height for this area. Cabinet volume shall be included in the kitchen volume.</p>	DAPIA/QCM	IPIA	IPIA inspection
5.2 Bath exhaust airflow rate and sound level	<p>For continuously-operated fans airflow must achieve ≥ 20 CFM and sound levels must be ≤ 1 sone.</p> <p>For intermittently-operated fans airflow must achieve ≥ 50 CFM and sound levels must be ≤ 3 sones.</p> <p>HRV and ERV fans are exempt from the sone requirement.</p>	DAPIA/QCM	IPIA	IPIA inspection
6 Air Filtration				



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

6.1 Air filtration	Central forced-air HVAC system(s) must have minimum MERV 8 filters. Air handler must be protected from dust during home production/storage and transport.	DAPIA/QCM	IPIA	IPIA inspection
6.2 Sealing of the filter access panel	To prevent bypass, the filter access panel must include a gasket or comparable sealing mechanism and fit snugly against the exposed edge of filter when closed.	DAPIA/QCM	IPIA	IPIA inspection
6.3 All return air passes through filter	All return air and mechanically supplied outdoor air must pass through a filter prior to conditioning.	DAPIA/QCM	IPIA	IPIA inspection
7 Combustion Appliances				
7.1 Drafted or direct vented appliances	Furnaces, boilers, and water heaters located within the home's pressure boundary must be mechanically drafted or direct-vented.	DAPIA/QCM	IPIA	IPIA inspection
7.2 Other unvented combustion	No unvented combustion appliances other than cooking ranges or ovens are permitted.	DAPIA/QCM	IPIA	IPIA inspection
8 Air Circulation				
8.1 Ceiling fans	Ceiling fans must be ENERGY STAR certified.	DAPIA/QCM	IPIA	IPIA inspection
WATER EFFICIENCY AND WATER MANAGEMENT				
Measure	Technical Requirement	Documentation	Verification	Frequency
9 Hot Water Distribution Efficiency, Water Fixtures				
9.1 DHW distribution efficiency and water fixtures	Meet one (1) of the following requirements: a. The hot water distribution system must store ≤ 0.5 gallons of water in any piping/manifold between the hot water source and any hot water fixture; OR, b. The hot water distribution system must store < 1.2 gallons of water in any piping/manifold between the hot water source and any hot water fixture AND maximum water fixture flow rates: bathroom faucets ≤ 1.5 gpm and showerheads ≤ 2.0 gpm.	DAPIA/QCM	IPIA	IPIA inspection
10 Water-Managed Building Assembly				
10.1 Flashed window/ door openings	Window and door openings fully flashed. ^{13 14 15}	DAPIA/QCM	IPIA	IPIA inspection



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

10.2 Step and kick-out flashing	Install step and kick-out flashing at all roof-wall intersections. ¹⁶	DAPIA/QCM	IPIA	IPIA inspection
10.3 Bituminous membrane	Self-adhering polymer-modified bituminous membrane applied at all valleys, roof deck penetrations, and over sheathing at eaves from the edge of the roof line to > 2 ft. up roof deck from the interior plane of the exterior wall.	DAPIA/QCM	IPIA	IPIA inspection
11 Water-Managed Building Materials				
11.1 Building material integrity	Building materials with visible signs of water damage or mold must not be installed or allowed to remain in the home.	DAPIA/QCM	IPIA	IPIA inspection
11.2 Drain pan and backflow prevention	For each condensate-producing HVAC component, add a corrosion-resistant drain pan (e.g., galvanized steel, plastic) as permitted by the equipment manufacturer's installation manual. The drain pan must drain to a conspicuous point of disposal in case of blockage. Backflow prevention valve included if connected to a shared drainage system.	DAPIA/QCM	IPIA	IPIA inspection
INDOOR AIR QUALITY				
Measure	Technical Requirement	Documentation	Verification	Frequency
12 Moisture Control				
12.1 Supply piping insulation	Piping must be placed on the conditioned side of the insulation.	DAPIA/QCM	IPIA	IPIA inspection
12.2 Hard-surface flooring	Hard-surface flooring must be applied in kitchens, baths, entry, laundry, and utility rooms.	DAPIA/QCM	IPIA	IPIA inspection
13 HVAC System				
13.1 Relative humidity level	Homes in HUD climate zone 1 must be "dehumidifier-ready": Provide a location with power and a drain for future installation of a dehumidifier.	DAPIA/QCM	IPIA	IPIA inspection
13.2 Ductwork in cavities	No building cavities are to be used as air supplies or returns, including transfer vents, unless lined with sealed duct materials (e.g., sheet metal, duct board).	DAPIA/QCM	IPIA	IPIA inspection
13.3 Ozone generators	No ozone generators provided with the home.	DAPIA/QCM	IPIA	IPIA inspection
14 Materials				



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

14.1 Low-emission carpet	At least 90 percent of carpet, carpet adhesives, and carpet cushion must be third-party certified as meeting the Carpet and Rug Institute (CRI) Green Label Plus testing program criteria.	DAPIA/QCM	IPIA	IPIA inspection
14.2 Low-emission wood product	Structural plywood and oriented strand board (OSB), must comply with PS1 or PS2, as appropriate, and made with moisture-resistant adhesives as indicated by "Exposure 1" or "Exterior" on the American Plywood Association (APA) trademark.	DAPIA/QCM	IPIA	IPIA inspection
15 Final (prior to home occupancy)				
15.1 Dry and clean HVAC system	HVAC system and ductwork must be verified to be dry and clean AND new filter installed before shipping the home.	DAPIA/QCM	IPIA	IPIA inspection
Renewable-Ready Features				
Measure	Technical Requirement	Documentation	Verification	Frequency
16 PV-Ready				
16.1 Documentation	Include in the installation manual information about the location of PV breaker space and conduit for PV panels.	MIM	DAPIA	Every Home
16.2 Conduit to Inverter	Install a 1 in. electrical conduit, material as approved under the HUD Code, for wire run from the designated PV array location to the designated inverter location (cap and label both ends).	DAPIA/QCM	DAPIA	As per standard plant inspection protocol
16.3 Conduit to service panel	Install a 1 in. electrical conduit, material as approved under the HUD Code, from designated inverter location to electrical service panel (Cap and label both ends).	DAPIA/QCM	IPIA	As per standard plant inspection protocol
16.4 Circuit breaker slot requirement	Provide a labeled slot for a dual circuit pole breaker in the electrical service panel. Service panel must be sized and have space for a dual pole circuit breaker.	DAPIA/QCM	IPA	As per standard plant inspection protocol

Field Installed Measures				
Measure	Technical Requirement	Documentation	Verification	Frequency
1 Envelope and Foundation System				
1.1 Radon mitigation	All the following radon-resistant features must be installed in homes in EPA Radon Zone 1 (see	Manufacturer's installation Manual (MIM)	Field inspection by manufacturer's representative	2%



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

	www.epa.gov/radon/zonemap.html), except where noted. ¹⁷ Homes with raised pier foundation are exempt from the radon mitigation requirement.		(FIELD)	
1.2 Sealing common walls	In attached homes, gaps between units must be sealed at all exterior boundaries to form a continuous air barrier separating conditioned from unconditioned spaces.	MIM	FIELD	2%
2 HVAC and Electric System				
2.1 Outdoor packaged HVAC units	Outdoor package units are allowed but such systems must: a. be a heat pump; AND b. have outside duct runs that are less than 20 feet in length each for supply and return; and, have exterior ducts wrapped with \geq R-8 insulation.	MIM	FIELD	2%
2.2 Garage HVAC equipment	Air-handling equipment or ductwork cannot be placed in a garage.	MIM	FIELD	2%
2.3 Ventilation before occupancy	Home must be ventilated before occupancy. Ventilate the home with outside air at the highest rate and duration practical, meeting ventilation requirements for outdoor air flow and humidity control: During and shortly after installing products that are known sources of contaminants (e.g., cabinets, carpet padding and painting), AND During the period between finishing and occupancy. If whole house ventilation cannot be scheduled prior to occupancy, advise the buyer to operate the ventilation system at the highest rate it can provide during the first few months of occupancy, meeting the above requirements.	MIM	FIELD	Every home
3 Water Management and Moisture Control				
3.1 For expansive or collapsible soils	For homes with a basement on expansive or collapsible soils, gutters and downspouts must be provided that empty to lateral piping that discharges water on sloping final grade \geq 5 ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water \geq 10 ft. from foundation.	MIM	FIELD	2%
3.2 Capillary break beneath slabs	Provide capillary breaks beneath all slabs (e.g., slab on grade, basement	MIM	FIELD	2%



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

	slab), except crawlspace slabs, using either: ≥ 6 mil polyethylene sheeting lapped 6-12 in., or ≥ 1 in. extruded polystyrene insulation with taped joints.			
3.3 Capillary break at crawlspace	Provide capillary break at crawlspace floors, except raised pier foundation, using ≥ 6 mil polyethylene sheeting lapped 6-12 in.	MIM	FIELD	2%
3.4 Below-grade walls and crawlspace	Exterior surface of below-grade walls of basements and unvented crawlspaces must be finished as follows: a. For poured concrete, masonry, and insulated concrete forms: finished with damp-proofing coating. b. For wood framed walls: finished with polyethylene and adhesive or other equivalent waterproofing.	MIM	FIELD	2%
3.5 Vapor retarder at below grade wall	Class 1 vapor retarder must not be installed on interior side of air permeable insulation in exterior below-grade walls.	MIM	FIELD	2%
3.6 Sump pump cover	Sump pump covers must be mechanically attached with full gasket seal or equivalent.	MIM	FIELD	2%
3.7 Drain tiles	Drain tiles must be installed at basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor.	MIM	FIELD	2%
3.8 Drain or sump pump and check valve	Drain or sump pump must be installed in basements and crawlspaces. In EPA Radon Zone 1 (see www.epa.gov/radon/zonemap.html), check valve also must be installed. Not required for raised pier foundation.	MIM	FIELD	2%
3.9 Below slab layer requirement	Layer of aggregate or sand (4 in.) with geotextile matting must be installed below slabs AND radon techniques must be used in EPA Radon Zone 1. Not required for raised pier foundation.	MIM	FIELD	2%
3.10 Sealed basements/crawlspaces	Basements/crawlspaces must be insulated, sealed, and conditioned. Not required for raised pier foundation.	MIM	FIELD	2%
3.11 Water splash damage protection	If gutters are not provided, homes must be protected from water splash damage using one of the below methods: a. Extend the foundation walls at least 16 in. above final grade; OR b. Provide a drip line at eaves that is horizontally 16 in. away from the edge of the foundation wall; OR	MIM	FIELD	2%



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

	c. Use cladding materials that are decay and rot resistant and can tolerate regular wetting extending at least 16 in. above final grade and install a well-sealed, continuous drainage plane per manufacturer’s instructions.			
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U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

Footnotes:

1. A manufactured home is defined as a home built in a factory that is subject to the federal Manufactured Home Construction and Safety Standards (commonly referred to as the HUD Code) contained in 24 CFR 3280.
2. A recognized 'Quality Assurance Provider' (QA Provider) is an organization that supervises the third-party inspections required for plant certification, home labeling, and ongoing plant certification maintenance. The QA Provider may fulfill these responsibilities itself, or it may use qualified, independent, third-party consultants. Until DOE recognizes QA Providers for the DOE ZERH Program, DOE will recognize the use of EPA-recognized QA Providers. A list of recognized QA Providers can be found at www.energystar.gov/manufacturedhomes.
3. Certification of a manufactured home to meet DOE ZERH requirements is not intended to imply compliance with applicable codes. In cases where requirements of the federal codes or manufacturers' installation instructions overlap or conflict with DOE ZERH program requirements:
 - a. DOE ZERH requirements shall be met if they exceed the stringency of code requirements or installation instructions;
 - b. DOE ZERH requirements shall not be met if they conflict with code requirements or installation instructions. In such cases, the homes may not be certified unless the QA Provider has determined that no equivalent option is available that could meet the intent of the conflicting requirement.
4. Climate Zone boundaries as established by the Energy Conservation Standards for Manufactured Homes contained in 10 CFR 460. Climate Zone 1 consists of Alabama, Florida, Georgia, Hawaii, Louisiana, Mississippi, South Carolina, and Texas. Climate Zone 2 consists of Arkansas, Arizona, California, Kansas, Kentucky, Missouri, New Mexico, North Carolina, Oklahoma, and Tennessee. Climate Zone 3 consists of all other states.
5. The overall coefficient of heat transmission (U_o) shall be determined by methods outlined in 10 CFR 460.102 (e) and is expressed in units of Btu / (hr.) (sq. ft.) (F).
6. SHGC requirements apply to windows, skylights and doors $\geq 50\%$ glazed. An area-weighted average of windows, skylights and doors $\geq 50\%$ glazed shall be permitted to satisfy the SHGC requirements.
7. Ducts are not required to be buried within ceiling insulation. If they are, DOE recommends but does not require that the ducts comply with the insulation and leakage requirements of Sections 403.3.3 and 403.3.7 of the 2021 International Energy Conservation Code, as well as the vapor retarder requirements of Section 604.11 of the 2021 International Mechanical Code or Section M1601.4.6 of the 2021 International Residential Code. Burying ducts within ceiling insulation is not an alternative to the requirement that ducts in unconditioned attics have at least R-8 duct insulation.
8. DOE Reserves the right to add additional point package options to Exhibit 2 as revisions to this specification. New options will be published and made available to all program participants if developed.
9. 'Heat Pump' refers to an air-source or ground-source heat pump, including those with electric, gas, or propane backup. The SEER2 and HSPF2 metrics are established by Appendix M1 to the Uniform Test Method for Measuring the Energy Consumption of Central Air Conditioners and Heat Pumps contained in 10 CFR 430 and heat pump manufacturers are required to report performance using these metrics by January 1, 2023.
10. One fixture per home may be excluded from the requirement to install an LED light. As an alternative to installing LED lighting at the manufacturing plant, LED bulbs may be shipped in packaging with the home.
11. For a list of current ENERGY STAR products, visit www.energystar.gov/products.
12. Reduce Thermal Bridging Option 1: Advanced framing
 - a. Minimum stud spacing of 16 in. on center; AND
 - b. All wall corners have at least R-6 insulation; AND
 - c. Double flat header permitted for doors and windows up to 46.5"; triple flat permitted up to 66"; headers on edge insulated, except where other sizes required structurally; AND
 - d. Limit framing to a maximum of one pair of jack studs per window opening to support the header and windowsill, except where additional jack studs are needed for structural support.
13. Window Flashing (for homes with weather resistant barrier installed over sheathing) shall be installed using the following steps (note: equivalent innovative materials may be installed per flashing material manufacturer's instructions):
 - a. Cut an "I" in the weather resistant barrier over the window rough opening; AND
 - b. Install pan flashing in the window rough opening; AND
 - c. Caulk or otherwise seal the top and sides of the window rough opening, but not the bottom; AND
 - d. Install the window over the caulk, then flash the sides and top of the window and finally, fold down the head flap and tape its seams and bottom edge.
14. Window Flashing (for homes using hard siding and no sheathing) shall be installed using the following steps (note: equivalent innovative materials may be installed per flashing material manufacturer's instructions):
 - a. Install pan flashing in the window rough opening over the siding; AND
 - b. Caulk or otherwise seal the top and sides of the window rough opening, but not the bottom; AND
 - c. After the installation of the windows, flash the bottom, the sides, and top of the window; AND
 - d. Use trim to cover the flashing.
15. Flash doors as described above for windows and consistent with door manufacturer's instructions



U.S. DOE Zero Energy Ready Home Manufactured Homes National Program Requirements, Version 1

16. Step and kickout flashing (for roofs with roof-wall intersections) shall be installed using the following steps (note: equivalent innovative materials may be installed per flashing material manufacturer's instructions):

- a. Apply roof underlayment over roof deck and up the sidewall over weather resistant barrier; AND
- b. Install shingle starter strip then kick-out diverter; attach to roof deck but not sidewall; AND
- c. Place first shingle and next section of sidewall flashing over upper edge of diverter; AND
- d. Install remaining sidewall flashing, counter flashing, and shingles; AND
- e. Apply self-adhesive flashing over top edge of the wall flashing, diverter, and weather resistant barrier; AND
- f. Install the weather resistant barrier, cut house wrap to fit over diverter, and tape top of cut.

17. All the following radon-resistant features must be installed in homes in EPA Radon Zone 1 (except for homes on raised pier foundations):

- a. Capillary break installed according to Specification 1.2, irrespective of climate zone.
- b. Exception: In dry climates as defined by 2015 IECC Figure 301.1, a "pipe loop" in a trench of clean aggregate along the entire inside perimeter of the foundation (installed according to ANSI/AARST CCAH 403.1.1) can be used in lieu of a uniform layer of aggregate under the entire slab.
- c. A 3 or 4 in. diameter gas-tight vertical vent pipe, clearly labeled as a component of a radon reduction system. The vent pipe shall be connected to an open T-fitting in the aggregate layer (or connected to geotextile drainage matting according to the manufacturer's instructions) beneath the polyethylene sheeting, extending up through the conditioned spaces and terminating a minimum of 12 in. above the roof opening. At least 10 ft. of horizontal perforated drain tile is to be attached to the T-fitting beneath the polyethylene sheeting placed over earthen crawlspaces and below concrete slabs. Note: suction points are not permitted on sump lids.
- d. Radon fan (i.e., an active system) OR an electrical receptacle installed in an accessible attic location near the radon vent pipe (i.e., a passive system) to facilitate future fan installation if needed. A space surrounding the radon pipe, having a vertical height of not less than 48 inches and a diameter of not less than 21 inches, shall be provided in the attic area where the radon fan can be installed, if required.
- e. Homes with no accessible attic location for a fan must utilize another exterior location or a garage that is not below conditioned space per ANSI/AARST CCAH. The branch circuit supply shall be labeled at the electrical panel indicating its intended use.
- f. Foundation air sealing with polyurethane caulk or the equivalent at all slab openings, penetrations and control or expansion joints.

Solar Information for Retailers

Energy-efficient eBuilt™ homes can save homeowners up to **40-50%** on their power bills annually,¹ and even more if they add a renewable solar energy system after purchasing their home.

Use these guidelines to educate customers about solar installation and how to promote the solar feature with correct imagery.

Solar Installation

We recommend a ground installation for several reasons:



Ground installation of solar panels allows homeowners to place the panels for optimal energy generation without impacting the direction the home faces.



Improper roof installation from a third-party solar vendor could potentially damage the roof, which would not be covered by the home warranty.

Promoting Solar Capability

In marketing the solar capability of eBuilt™ homes:



Don't use imagery with solar panels on the roof



DO use images of solar panels on the ground

We've created a handout, available in the eBuilt Homeowner Information Kit, you can provide to homeowners who want to know more about adding solar to their home after purchase. This information is also available in the homeowner's warranty pack.

SCAN QR CODE

or visit <https://bit.ly/eBuiltMarketingSupport> to access and download the *Ready to Go Solar?* homeowner flyer.



eBuilt™

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf



Installing a Dehumidifier

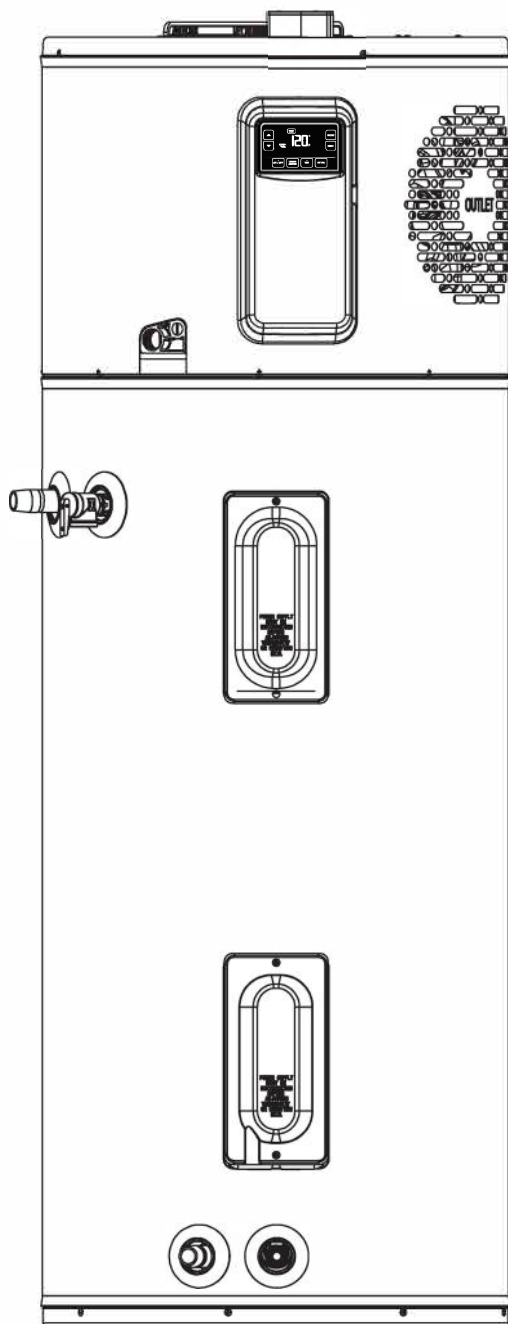
eBuilt™ homes in some climate zones are designed to accommodate a dehumidifier in the utility room. This dedicated area includes a nearby outlet and drain for the dehumidifier.

If you choose to add a dehumidifier, please follow these instructions:

- ✓ When purchasing your dehumidifier, make sure it is equipped with a hose hookup.
- ✓ Purchase the required length of hose with female connectors on both ends.
- ✓ Next, locate the drain in your home's dedicated dehumidifier area. The drain is located behind an access door (approximately four inches by six inches) along the bottom of the floor.
- ✓ Hook the hose to the dehumidifier drain, then to your home's drain. Ensure all connections are tight and leak proof.
- ✓ Make sure the drain on the dehumidifier is higher than the discharge connection in the wall. If it is not, elevate the dehumidifier as necessary.
- ✓ Run the dehumidifier and check for leaks to ensure the unit is properly draining to the exterior of the home.



Electric Residential Hybrid Water Heater



The purpose of this manual is twofold: one, to provide the installer with the basic directions and recommendations for the proper installation and adjustment of the water heater; and two, for the owner-operator, to explain the features, operation, safety precautions, maintenance and troubleshooting of the water heater. This manual also includes a parts list.

It is imperative that all persons who are expected to install, operate or adjust this water heater read the instructions carefully so they may understand how to perform these operations. If you do not understand these instructions or any terms within it, seek professional advice.

Any questions regarding the operation, maintenance, service or warranty of this water heater should be directed to the seller from whom it was purchased. If additional information is required, refer to the section on "If you need service."

DO NOT destroy this manual. Please read carefully and keep in a safe place for future reference.



Recognize this symbol as an indication of Important Safety Information!

Safety Information

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FOR YOUR RECORDS

Write the model and serial numbers here:

You can find them on a label on the appliance.

Staple sales slip or cancelled check here.

Proof of the original purchase date is needed to obtain service under the warranty.



READ THIS MANUAL

Inside you will find many helpful hints on how to use and maintain your water heater properly. Just a little preventive care on your part can save you a great deal of time and money over the life of your water heater.

You'll find many answers to common problems in the Before You Call For Service section. If you review our chart of Troubleshooting Tips first, you may not need to call for service at all.



READ THE SAFETY INFORMATION

Your safety and the safety of others are very important. There are many important safety messages in this manual and on your appliance. Always read and obey all safety messages.



This is the safety alert symbol. Recognize this symbol as an indication of Important Safety Information!

This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol and either the word “DANGER”, “WARNING”, “CAUTION” or “NOTICE”.

These words mean:

▲ DANGER

An imminently hazardous situation that will result in death or serious injury.

▲ WARNING

A potentially hazardous situation that could result in death or serious injury and/or damage to property.

▲ CAUTION

A potentially hazardous situation that may result in minor or moderate injury.

NOTICE:

Attention is called to observe a specified procedure or maintain a specific condition.

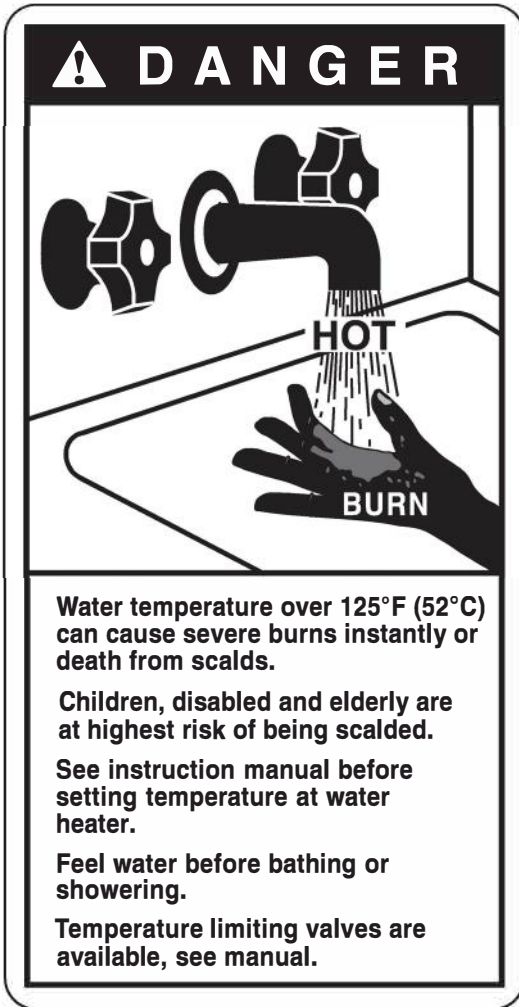
IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

⚠ DANGER!

WATER TEMPERATURE SETTING



Safety and energy conservation are factors to be considered when selecting the water temperature setting of water heater. Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined on the label pictured below. This label is also located on the water heater near the thermistor access panel.



NOTICE: Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See page 16 for more details and contact a licensed plumber or the local plumbing authority for further information.

When used in demand response applications a thermostatic mixing valve conforming to ASSE 1017 shall be installed on the hot water supply line following all manufacturer installation instructions. See page 32 for additional installation information.

Time/Temperature Relationship in Scalds

Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (65°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute

The chart shown above may be used as a guide in determining the proper water temperature for your home.

⚠ DANGER: Households with small children, disabled, or elderly persons may require a 120°F (49°C) or lower thermostat setting to prevent contact with “HOT” water.

The temperature of the water in the heater is regulated by the water heater interface control. To comply with safety regulations the temperature was set at 120°F (49°C) before the water heater was shipped from the factory.

The illustration below shows the water temperature setting.

Refer to the Operating Instructions in this manual for detailed instructions in how to adjust the water temperature.



⚠ DANGER: Hotter water increases the potential for Hot Water SCALDS.

IMPORTANT SAFETY INFORMATION. READ ALL INSTRUCTIONS BEFORE USING.

WARNING!

For your safety, the information in this manual must be followed to minimize the risk of fire or explosion, electric shock, or to prevent property damage, personal injury, or loss of life.

Be sure to read and understand the entire Use and Care Manual before attempting to install or operate this water heater. It may save you time and cost. Pay particular attention to the Safety Instructions. Failure to follow these warnings could result in serious bodily injury or death. Should you have problems understanding the instructions in this manual, or have any questions, STOP, and get help from a qualified service technician, or the local electric utility.



FOR INSTALLATIONS IN THE STATE OF CALIFORNIA

California Law requires that all new and replacement water heaters, and all existing residential water heaters, must be braced, anchored, or strapped to resist falling or horizontal displacement due to earthquake motion. At a minimum, any water heater shall be secured in accordance with the California Plumbing Code, or modifications made thereto by a city, county, or city and county pursuant to Section 17958.5. Generic instructions for California titled "Guidelines for Earthquake Bracing Residential Water Heaters" can be obtained by:

- Writing the California, Department of General Services, Division of State Architect, 1102 Q Street, Suite 5100, Sacramento, CA 95814
- Calling (916) 445-8100
- Following web address:
https://www.dgs.ca.gov/-/media/Divisions/DSA/Publications/gas_shutoff/waterheaterbracing



SAFETY PRECAUTIONS

Have the installer show you the location of the circuit breaker and how to shut it off if necessary. Turn off the circuit breaker if the water heater has been subjected to overheating, fire, flood, physical damage or if the ECO (temperature limiting control) fails to shut off.



- Read this manual entirely before installing or operating the water heater.
- Use this appliance only for its intended purpose as described in this Use and Care Manual.



- Be sure your appliance is properly installed in accordance with local codes and the provided installation instructions.

- **DO NOT** attempt to repair or replace any part of your water heater unless it is specifically recommended in this manual. All other servicing should be referred to a qualified technician.
- **DO NOT** attempt to repair or replace the compressor, refrigerant, or any part associated with the sealed refrigerant system.
- **DO NOT** turn on the electrical supply or operate this water heater unless it is completely full of water.

WARNING!

Disconnect all power to unit before starting maintenance. Failure to do so can cause electrical shock resulting in severe personal injury or death.

WARNING!

FLAMMABLE CONTENTS UNDER PRESSURE. The compressor is not a serviceable part. The compressor wiring terminals may arc allowing pressurized refrigerant and oil to escape, ignite and cause serious bodily injury, severe burns or death.



READ AND FOLLOW THIS SAFETY INFORMATION CAREFULLY.

SAVE THESE INSTRUCTIONS

Refrigerant

This Hybrid Water Heater is factory charged with an environmentally friendly, non-chlorinated refrigerant, R134A. This refrigerant has zero ozone depletion potential.

Installing the water heater

The location chosen for the water heater must take into consideration the following:

Local Installation Regulations

This water heater must be installed in accordance with these instructions, local codes, utility codes, utility company requirements or, in the absence of local codes, the latest edition of the National Electrical Code. It is available from some local libraries or can be purchased from the National Fire Protection Association,

Batterymarch Park, Quincy, MA 02269 as booklet ANSI/NFPA 70.

Canadian installations should refer to CSA22.1, a copy can be purchased from the Canadian Standards Association, 5050 Spectrum Way, Mississauga, ONT L4W 5N6

Location

Locate the water heater in a clean dry area as near as practical to the area of greatest heated water demand. Long un-insulated hot water lines can waste energy and water.

Place the water heater in such a manner that the thermistor and element access panels can be removed to permit inspection and servicing such as removal of elements or checking controls.

The water heater and water lines should be protected from freezing temperatures. **DO NOT** install the water heater in outdoor, unprotected areas.

Make certain the floor underneath the water heater is strong enough to sufficiently support the weight of the water heater once it is filled with water.

Floor isolation kit is recommended to minimize vibrations (where applicable).

⚠ CAUTION: The water heater should not be located in an area where leakage of the tank or connections will result in damage to the area adjacent to it or to lower floors of the structure. Where such areas cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the water heater.

NOTICE: Installation in a confined space will lead to higher power consumption if adequate ventilation is not provided.

It is recommended that the hybrid water heater be installed where ambient temperatures **DO NOT** exceed 145°F (63°C).

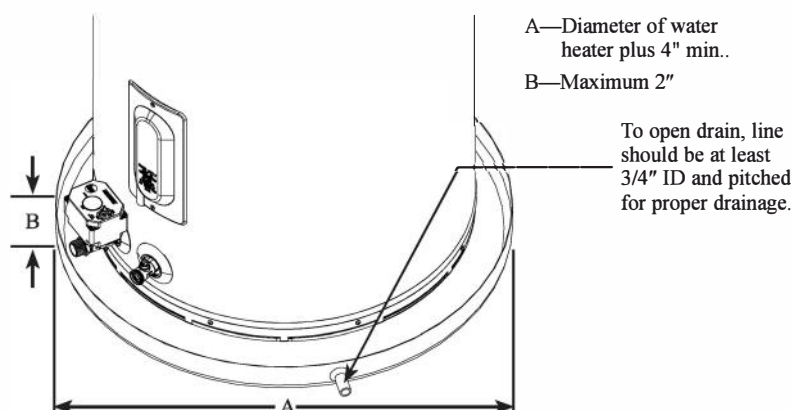
Insufficient air exchange will result in increased energy consumption levels.

Clearances		
Rear	Sides	Top
0"	0"	6"

NOTICE: Auxiliary drain pan **MUST** conform to local codes.

Drain Pan Kits are available from the store where the water heater was purchased, or any water heater distributor.

Drain Pan should not obstruct cold inlet or drain valve.



Inspect Shipment

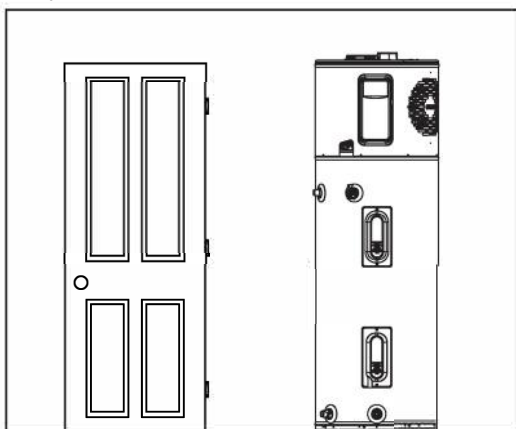
Inspect the water heater for possible damage. Check the markings on the rating plate of the water heater to be certain the power supply corresponds to the water heater requirements. Rating plate is located on front of water heater.

Installing the water heater

Locations that provide optimal efficiency

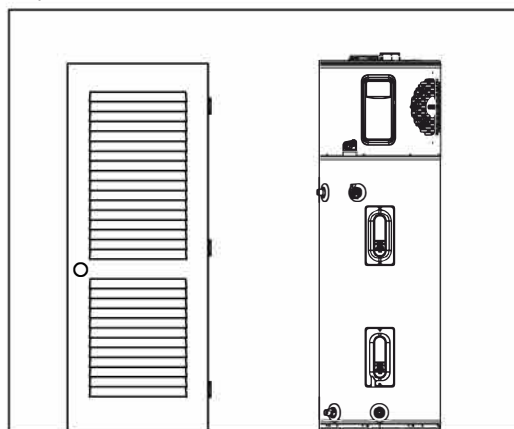
Heater: Not Ducted

Room size: Larger than 700 ft³ (e.g. 7' x 10' x 10').
Requirements: No additional ventilation needed.

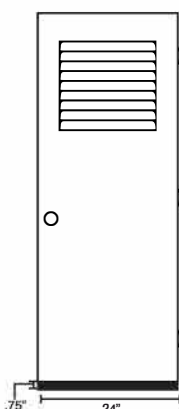


Heater: Not Ducted

Room size: Smaller than 700 ft³ (e.g. 7' x 10' x 10').
Requirements: Full louvered door OR two louvers top and bottom. See below.



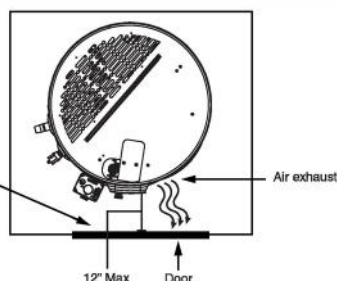
NOTICE: If air temperature in installed location drops more than 15°F (8°C) during heating, air circulation is insufficient for efficient operation. Utilize ducting to direct cold exhaust air to another location.



Heater: Not ducted

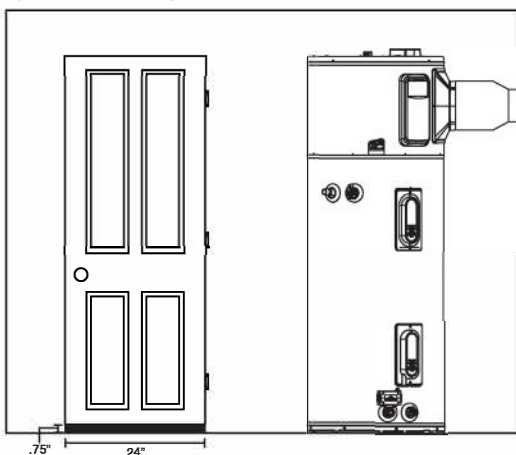
Room: Small Closet

Requirements: * Air gap under door equal to 18 in² (0.75" clearance).
* Louver must be located the same height on door as the air exhaust on heater.
* Heater air exhaust must be positioned towards louver within one foot of door.



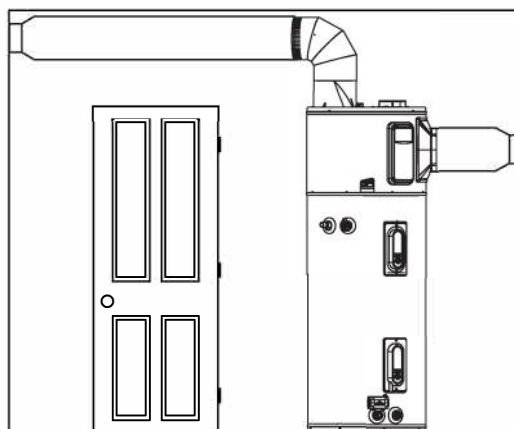
Heater: Ducted with inlet OR outlet duct

Room size: Any size room
Requirements: Air gap under door equal to 18 in² (0.75" clearance)



Heater: Ducted with inlet AND outlet duct

Room size: Any size room
Requirements: No additional ventilation needed.



Thermal Expansion

Determine if a check valve exists in the inlet water line. Check with your local water utility. It may have been installed in the cold water line as a separate back flow preventer, or it may be part of a pressure reducing valve, water meter or water softener. A check valve located in the cold water inlet line can cause what is referred to as a “**closed water system**”. A cold water inlet line with no check valve or back flow prevention device is referred to as an “**open**” water system.

As water is heated, it expands in volume and creates an increase in the pressure within the water system. This action is referred to as “**thermal expansion**”. In an “**open**” water system, expanding water which exceeds the capacity of the water heater flows back into the city main where the pressure is easily dissipated.

A “**closed water system**”, however, prevents the expanding water from flowing back into the main supply line, and the result of “**thermal expansion**” can create a rapid and dangerous pressure increase in the

water heater and system piping. This rapid pressure increase can quickly reach the safety setting of the relief valve, causing it to operate during each heating cycle.

Thermal expansion, and the resulting rapid and repeated expansion and contraction of components in the water heater and piping system can cause premature failure of the relief valve, and possibly the heater itself. Replacing the relief valve **WILL NOT** correct the problem!

The suggested method of controlling thermal expansion is to install an expansion tank in the cold water line between the water heater and the check valve (refer to the illustration on the next page). The expansion tank is designed with an air cushion built in that compresses as the system pressure increases, thereby relieving the over pressure condition and eliminating the repeated operation of the relief valve. Other methods of controlling thermal expansion are also available. Contact your installing contractor, water supplier or plumbing inspector for additional information regarding this subject.

NOTICE: The inlet and outlet water nipple remain with the black markings pointed up.

Water Supply Connections

Refer to the illustration on the next page for suggested typical installation. The installation of flexible connectors is recommended on the hot and cold water connections. Flexible connections provide vibration isolation and allow the water heater to be easily disconnected for servicing if necessary. The **HOT** and **COLD** water connections are clearly marked and are 3/4in. NPT on all models. Install a shut-off valve in the cold water line near the water heater.

NOTICE: DO NOT apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to adapter before fitting adapter to the water connections on heater. Any heat applied to the water supply fittings will permanently damage the dip tube and/or heat traps.

See page 9 on "To Fill The Water Heater".

Condensate Drains

Consult local codes or ordinances for specific requirements. Refer to page 5.

IMPORTANT: When making drain fitting connections to the drain tubing, use a thin layer of piping tape or silicone and install hand tight.

IMPORTANT: When making drain fitting connections to the drain tubing, **DO NOT** overtighten. Overtightening fittings can split pipe connections on the drain pan.

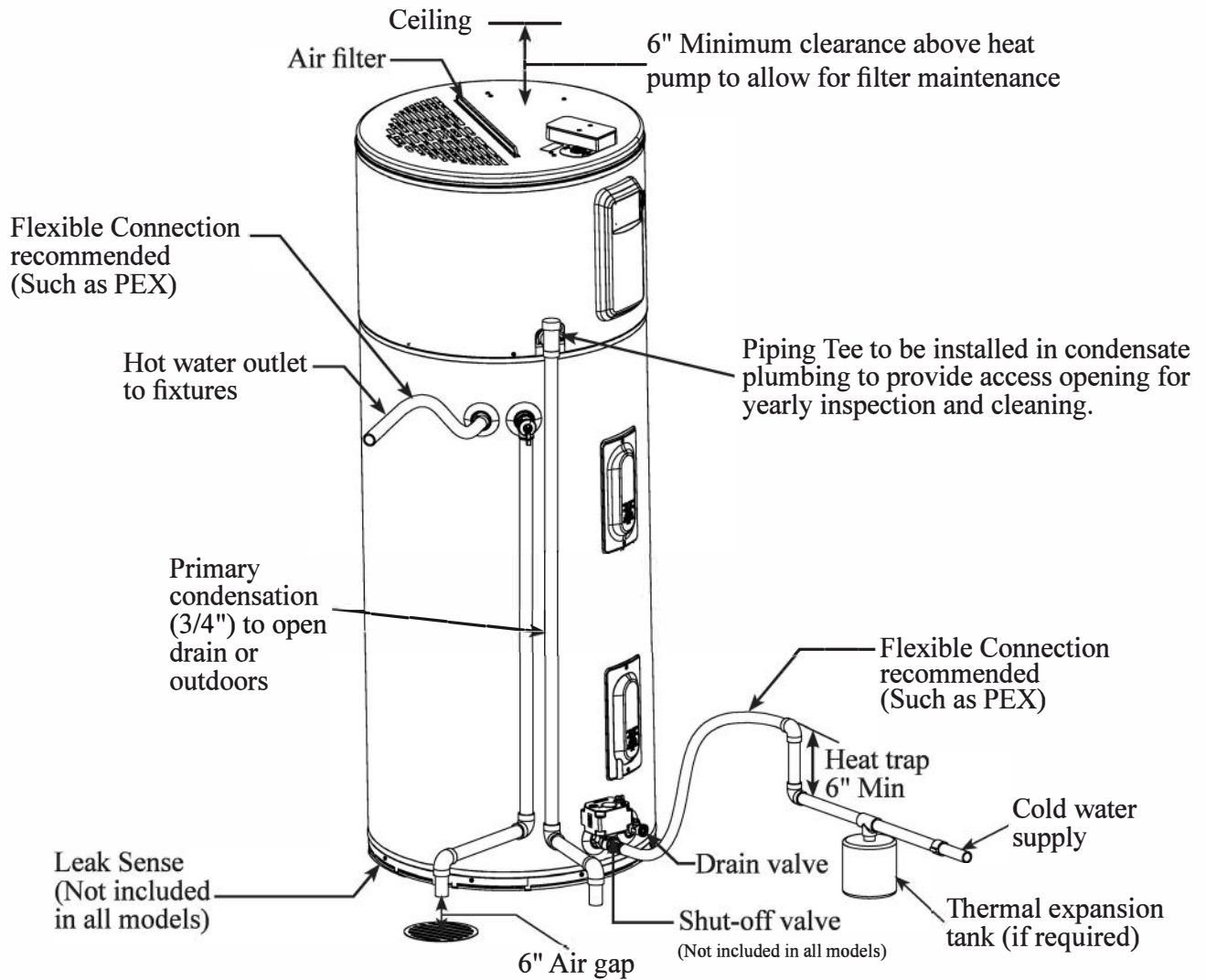
- This unit is equipped with a 3/4" NPT female primary condensate connection. Use MIP fittings for connections.
- **DO NOT** reduce drain line size less than connection size provided on condensate drain.

- All drain lines must be pitched downward away from the unit a minimum of 1/8" per foot of line to ensure proper drainage.
- Drain lines must include a P-trap if connected to a sewer pipe.
- If no drain is available, then a common condensate pump with a capacity no less than 2 gallon per day must be installed.
- **DO NOT** allow condensate to drain into the water heater drain pan.
- The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.

NOTICE: Condensate from this unit is not Acidic and is not required to be neutralized.

Installing the water heater

Typical Installation



A new combination temperature and pressure relief valve, complying with the Standard for Relief Valves for Hot Water Supply Systems, ANSI Z21.22/CSA 4.4, is factory installed and must remain in the opening provided and marked for the purpose on the water heater. No valve of any type should be installed between the relief valve and the tank.

⚠ WARNING: The pressure rating of the relief valve must not exceed 150 PSI, the maximum working pressure of the water heater as marked on the rating plate.

Relief Valve

The btu/h rating of the relief valve must not be less than the input rating of the water heater as indicated on the rating label located on the front of the heater (1 watt=3.412 btu/h).

Connect the outlet of the relief valve to a suitable open drain so that the discharge water cannot contact live electrical parts or persons and to eliminate potential water damage.

Piping used should be of a type approved for hot water distribution. The discharge line must be no smaller than the outlet of the valve and must pitch downward from the valve to allow complete drainage (by gravity) of the relief valve and discharge line. The end of the discharge line should not be threaded or concealed and should be protected from freezing. No valve of any type, restriction or reducer coupling should be installed in the discharge line.

⚠ WARNING: DO NOT connect other plumbing to the T&P plumbing; it must go directly to a suitable open drain. DO NOT connect the T&P plumbing to the condensate plumbing.

⚠ WARNING: DO NOT turn on the electrical supply or operate this water heater unless it is completely full of water. The tank must be full of water before water heater is turned on. The water heater warranty does not cover damage or failure resulting from operation with an empty or partially empty tank.

To Fill the Water Heater

Make certain the drain valve on the water heater is completely closed.

Open the shut-off valve in the cold water supply line.

Open each hot water faucet slowly to

allow the air to vent from the water heater and piping.

A steady flow of water from the hot water faucet(s) indicates a full water heater.

⚠ WARNING: Failure to follow the instructions provided in this manual may permanently damage the unit and void the manufacturer's warranty.

LeakGuard™

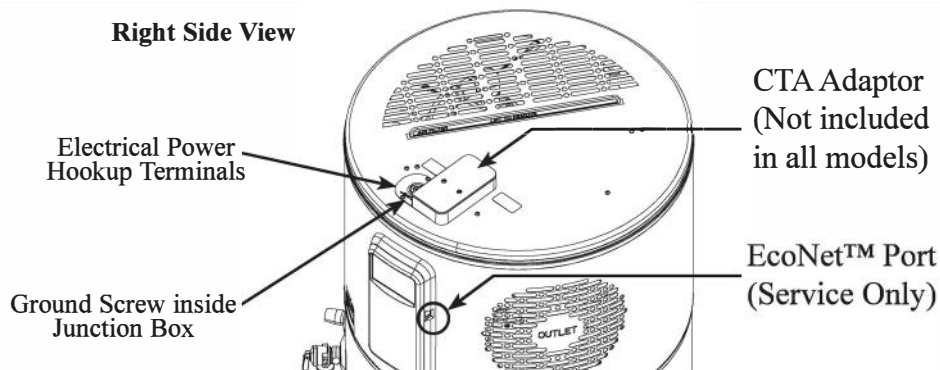
This water heater is equipped with built-in leak detection and automatic water shut off valve. The leak detection device (LeakSense™) detects the presence of water and immediately alerts the electronic control as the EcoNet app on the cellular phone. When water is detected, the electronic controls will shut down the heating elements and the automatic water shut off valve closes.

Self Check

The automatic water shut off valve has a self check feature which runs every 30 days once the water heater is powered on. This feature works by closing and reopening the automatic water shut off valve. In case the valve fails to reopen, the water heater will be DISABLED. The water heater gives alert when the automatic water shut off valve fails to close.

EcoNet™ Communication

EcoNet™ communication is provided for integration with home automation, energy management, and demand response systems. Connectivity is provided through the via wireless (Wi-Fi).



Electrical Connections

⚠ WARNING: Turn off electric power at the fuse box or service panel before making any electrical connections.

Also, the ground connection must be completed before making line voltage connections. Failure to do so can result in electrical shock, severe personal injury or death.

Disconnect all power to unit before starting maintenance. Failure to do so can cause electrical shock resulting in severe personal injury or death

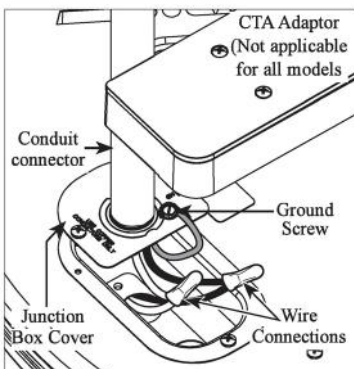
The unit must be grounded. Failure to do so can cause

electrical shock resulting in severe personal injury or death.

If the water heater has been subjected to fire, flood or physical damage, **DO NOT** operate the water heater again until it has been checked by a qualified service technician.

NOTICE: DO NOT use this appliance if any part has been under water. Immediately call a qualified installer or service agency to replace a flooded water heater. DO NOT attempt to repair the unit! It must be replaced.

Installing the water heater



Water heater junction box.

⚠ DO NOT turn on the electrical supply or operate this water heater unless it is completely full of water.

⚠ CAUTION: The presence of water in the piping and water heater does not provide sufficient conduction for a ground. Non-metallic piping, dielectric unions, flexible connectors etc. can cause the water heater to be electrically isolated.

Electrical Connections continued...

A separate branch circuit with copper conductors, overcurrent protective device and suitable disconnecting means must be provided by a qualified electrician.

All wiring must conform to local codes or latest edition of National Electrical Code ANSI/NFPA 70.

The water heater is completely wired to the junction box inside jacket at the top front of the water heater. An opening for 1/2 in. or 3/4 in. electrical fitting is provided for field wiring connections.

The voltage requirements and wattage load for the water heater are specified on the rating plate on the front of the water heater.

NOTICE: This guide recommends minimum branch circuit sizing and wire size based on National Electric Code. Refer to wiring diagrams in this manual for field wiring connections.

The branch circuit wiring should include either:

- 1** Metallic conduit or metallic sheathed cable approved for use as a grounding conductor and installed with fittings approved for the purpose.
- 2** Non-metallic sheathed cable, metallic conduit or metallic sheathed cable not approved for use as a ground conductor shall include a separate conductor for grounding. It should be attached to the ground terminals of the water heater and the electrical distribution box.

Branch Circuit Sizing And Wire Size Guide

Total Water Heater Wattage	Recommended Over Current Protection (Fuse or Circuit Breaker Amperage Rating)	Copper Wire Size AWG based on NE.C. Table 310-16 (75°C)
	240V	240V
2250	15	14
2750	15	14
3000	20	12
4000	25	10
5000	30	10
5500	30	10

NOTE: When sizing the breaker and wire for over current protection, include an additional 500W to the upper element wattage rating. This will account for the maximum amperage draw of the compressor and fan motor.

SINGLE PHASE WIRING

⚠ WARNING: If local codes require external application of insulation blanket kits the manufacturer's instructions included with the kit must be carefully followed.

Insulation Blankets

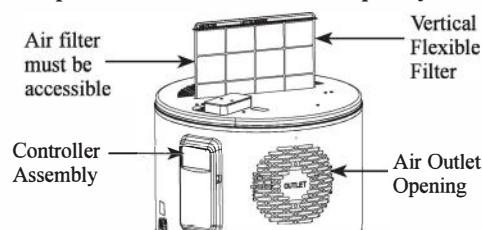
Insulation blankets, available to the general public, for external use on electric water heaters are not necessary. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. This water heater meets or exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements making an insulation blanket unnecessary.

The manufacturer's warranty does not cover any damage or defect caused by installation, attachment or use of any type of energy saving or other unapproved devices (other than those authorized by the manufacturer) into, onto or in conjunction with the water heater. The use of unauthorized energy saving devices may shorten the life of the water heater and may endanger life and property.

The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized devices.

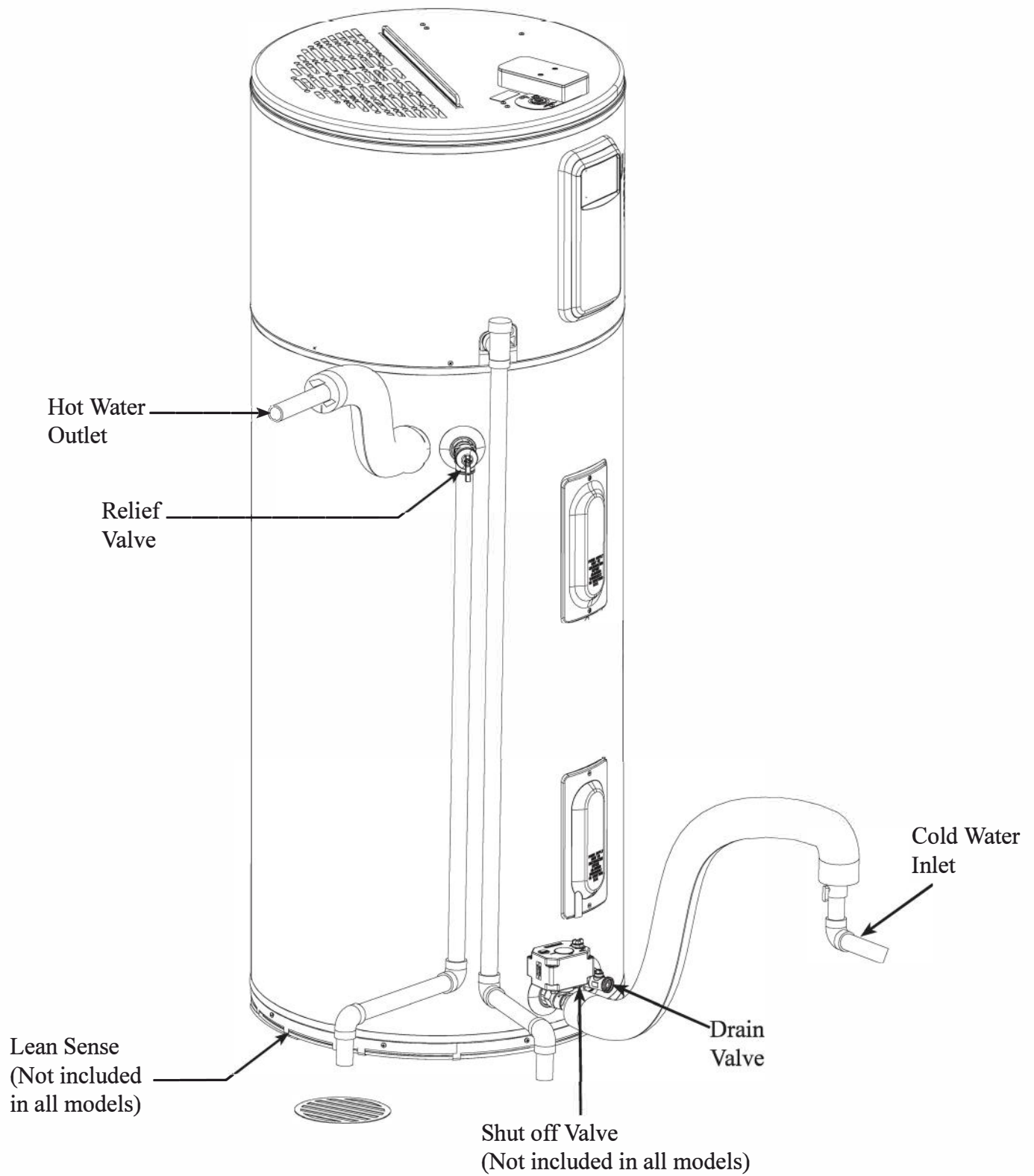
⚠ CAUTION: If local codes require the application of an external insulation blanket to this water heater, pay careful attention to the following so as not to restrict the proper function and operation of the water heater:

- **DO NOT** cover the operating or warning labels attached to the water heater or attempt to relocate them on the exterior of insulation blanket.
- **DO NOT** cover air openings on both sides of the water heater.
- **DO NOT** cover the Controller Assembly, temperature and pressure relief valve or drain valve.
- Inspect the insulation blanket frequently.



Hot and Cold Pipe Insulation Installation

Install the insulation on the cold water supply inlet and the hot water outlet as shown in the illustration.



Installing the water heater

Ducting Requirements

Always check with local building and HVAC codes before designing the duct system

The water heater may be ducted to the outdoors or another space as described in these instructions. Ducting configurations that does not comply with these guidelines are not supported.

DO NOT connect this water heater to existing duct work; it must be ducted separately from other appliances.

Ducting approved for HVAC applications is required.

Ducting must be adequately supported along both vertical and horizontal lengths.

UL Certified terminations must be used for ducting to the outside. These terminations have been evaluated to ensure there is sufficient protection from rain water entry and resistance to air flow is minimized.

Indoor registers approved for HVAC applications is required.

Rigid ducting must be isolated from floor joists or other structural members to minimize the transmission of noise and vibration. A short section (12 inch minimum) of flexible duct must be used between the water heater and rigid ducting as an isolation method.

Every foot of flexible ducting counts as three feet of rigid ducting.

Ducting must be insulated per HVAC codes (to prevent condensation).

Ensure cold air exhaust is sufficiently away from structures to prevent condensation on surfaces.

Maximum heater performance is obtained by lowering the resistance to air flow (regular filter maintenance is beneficial) and providing the unit with warm moist air.

Considerations when planning the duct system:

- Run the ducting the most direct route possible.
- Limit the number of elbows/bends.
- Use the largest duct size possible.
- Use the largest termination possible.
- Consider placement and direction of terminations (reduce recirculation of exhaust into the intake).

Calculated length of duct is the length on the inlet plus the length on the outlet. Any combination of duct lengths on the inlet and outlet is supported up to the maximum duct length (Table 1).

Duct System Configuration

The inlet and outlet ducting connections on the water heater accepts 8 inch diameter ducting. No additional adaptors are needed.

7 inch, 6 inch, 5 inch diameter ducting is supported. Table 1 lists the total feet of ducting allowed. For duct diameters smaller than 8 inch

diameter, Table 1 takes into account the duct reducer(s) and up to 10 feet of 8 inch rigid ducting (two elbows) before the duct reducer(s) at the unit. Duct Reducers must be installed within 10 feet (two elbows) of the unit or within 2 feet of the end of the duct.

Table 1.- Maximum Duct Length.

Duct Type / Diameter	8"	7"	6"	5"
Rigid	340'	160'	65'	17'
Flexible	125'	65'	25'	--

Equivalent feet for Duct Accessories

Elbows/Bends

Rigid duct elbows and flex bends greater than 45° is considered an elbow.

Flexible ducting bends' inner radius cannot be less than its diameter. If bends with tighter radiuses are needed, a rigid elbow must be used.

Maximum number of elbows/bends allowed are shown in [brackets] in Table 2.

Terminations/Registers

Table 2 equivalent feet for terminations includes the rodent screen.

For terminations and registers with smaller

diameters than the duct diameter, Table 2 accounts for the duct reducer and termination/register. Smaller diameter terminations and registers with more than a 2 ft. connection is not supported.

Damper

If ducting to the outside using an exhaust duct only (no intake duct), an approved Rheem damper should be installed no further than 10 ft. of rigid ducting total (two elbows equivalent) from the unit. This prevents outside air from coming into the living space. If ducting air from the outside to the inlet of the heater, no provision is made to prevent outside air from flowing into the living space.

Table 2.- Equivalent feet for Duct Accessories.

Description	8"	7"	6"	5"
Elbows/Flexible Bends (Each) [Maximum Allowed]	5' [8]	5' [6]	5' [4]	5' [2]
8 inch UL Certified Termination for ducting outside (Each)	5'	5'	5'	5'
Reduced diameter UL Certified Termination for ducting outside (Each)	N/A	10'	15'	20'
8 inch Register for ducting inside (Each)	5'	5'	5'	5'
Reduced diameter Register for ducting inside (Each)	N/A	10'	15'	20'
Rodent Screen (must be greater than 83% open area) (Each)	1'	1'	1'	1'
Rheem approved 8" diameter Duct Damper	25'	20'	10'	5'

Table 2 lists equivalent feet for duct accessories and reduced diameter terminations.

Accessory Kits

Part Number	Description	User For
SP20882	Earthquake Isolation Kit for Hybrid Water Heater.	Installations in Seismic Regions.
SP20883	Vibration Isolation Kit for Hybrid Water Heater.	Installation on Non-Concrete floors.
SP20884	8" Dia. UL Certified Termination kit.	Termination to the outside or to attic with 8" diameter.
SP20885	7" Dia. UL Certified Termination kit.	Termination to the outside or to attic with 7" diameter.
SP20886	6" Dia. UL Certified Termination kit.	Termination to the outside or to attic with 6" diameter.
SP20887	5" Dia. UL Certified Termination kit.	Termination to the outside or to attic with 5" diameter.
SP20888	8" Rheem Approved Damper Kit.	Exhaust only to the outside Ducting Configuration (No inlet Duct).
SP20889	25' Flexible 8" dia. duct kit.	For up to 25' of Ducting.
SP20890	Rigid Elbow Duct Kit.	Installation in tight places where space needs to be minimized.
SP17809	Outlet Duct Adaptor Kit	Use for exhaust cool and dry air to another place inside or outside the house (use where applicable)
AP19134	Leak Sensor	Use for water leak sensor (for select models only)
SP21105	Inlet Duct Adaptor Kit	Use for bring warm air from another place inside or outside the house (use where applicable)
SP21111	Gen V leak sensor and shut off valve kit	Use for preventing leak and automatic water shut off valve (for select models only)

Installing the water heater

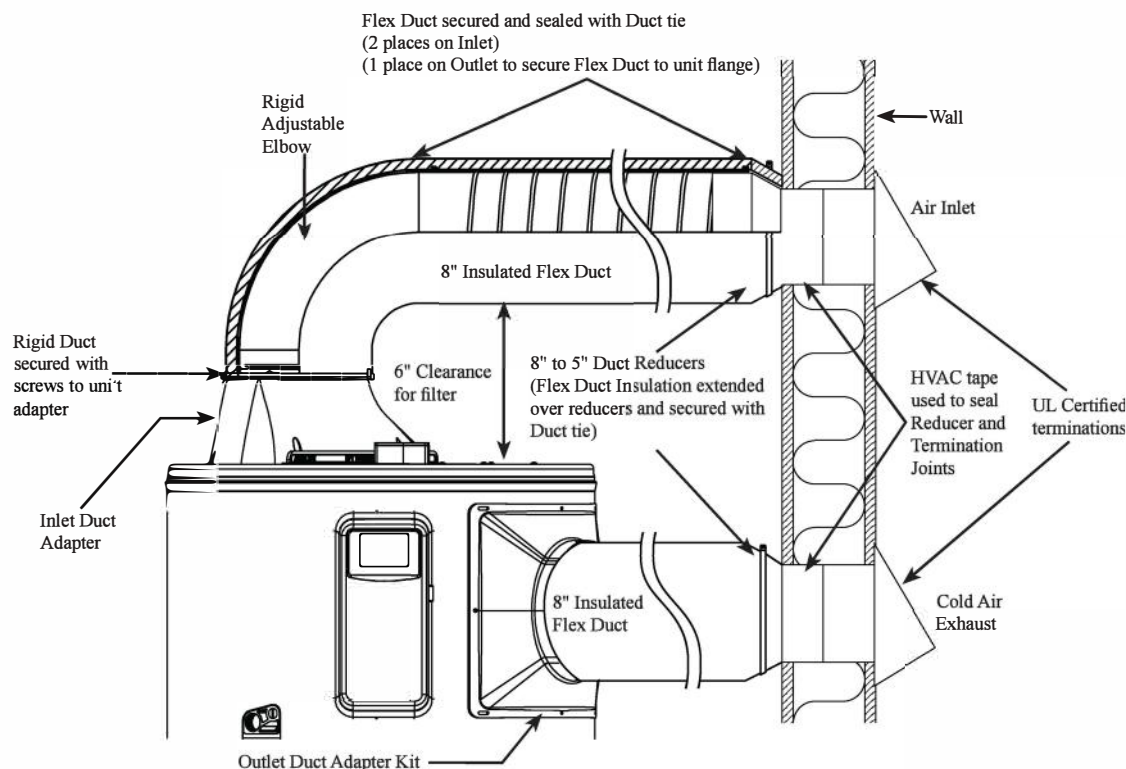
NOTICE: These seven questions should be answered to ensure correct duct configuration. See Ducting Example.

Ducting Example:

- 1** Exhaust/Inlet or both? Both, Inlet and Outlet
- 2** Ducting to outside of building or another room? Outside building.
- 3** Length of duct from water heater to termination? 20 ft.
- 4** Flexible or Rigid ducting? Flexible.
- 5** Diameter of ducting used? 8 in. Diameter
- 6** Diameter of wall penetrations? 5 in. Diameter
- 7** Number of elbows/bends? 3 Total – One on inlet and Two on Outlet
 - I. Does calculated ducting length exceed maximum allowable table?
 - a. 20 ft. (Outlet duct length)
 - b. 10 ft. (1 rigid elbow and 1 bend on outlet)
 - c. 20 ft. (reduced diameter termination outlet)
 - d. 20 ft. (Inlet duct length)
 - e. 5 ft. (1 Bend on inlet)
 - f. 20 ft. (reduced diameter termination inlet)
 - g. Total = 20+10+20+20+5+20 = 95 ft.

Using flexible 8 in. diameter duct, the maximum duct length allowed is 125 ft.; therefore, because 95 ft. is less than 125 ft., this is an acceptable ducting configuration.

Accessory Kits SP20887 (2 Kits), SP20889 (2 Kits) and SP20890 (1 Kit) are available for this installation.



Horizontal Duct Installation

Once the duct terminal location has been determined, make a hole through the exterior wall to accommodate the UL Certified Termination. Termination must exit exterior wall horizontally only.

Complete rest of the duct pipe installation to the water heater's duct connector fitting.

If necessary, support horizontal run as previously mentioned.

Installation Checklist

A. Water Heater Location

- ☐ Close to area of heated water demand.
- ☐ Indoors and protected from moisture, wet conditions, freezing temperatures (below 32°F (0°C)) and High temperatures (above 140°F (60°C)).
- ☐ Area free of flammable vapors.
- ☐ Provisions for Air Circulation (Louvered doors on ducting).
- ☐ Provisions made to protect area from water damage.
- ☐ Sufficient room to service heater.
- ☐ Six inches (6") of clearance from ceiling to top of Hybrid Water Heater to allow for filter maintenance.
- ☐ Access to condensate disposal.
- ☐ Vibration Isolation Kit (Non-Concrete floors).
- ☐ Hybrid seismic Kit (if required).

B. Water Supply

- ☐ Water heater completely filled with water.
- ☐ Air purged from water heater and piping.
- ☐ Water connections tight and free of leaks.
- ☐ Flexible water connections.

C. Relief Valve

- ☐ Temperature and Pressure Relief Valve properly installed and discharge line run to open drain.
- ☐ Discharge line protected from freezing.

D. Wiring

- ☐ Power Supply voltage agrees with water heater rating plate.
- ☐ Branch circuit wire and fusing or circuit breaker of proper size. (Recommended 15 amp & 30 amp breaker for select models).
- ☐ Electrical connections tight and unit properly grounded.
- ☐ 10 gauge wire.

E. Condensate Lines

- ☐ Condensate lines from heat pump installed correctly.
- ☐ Condensate lines from heat pump run to a suitable drain location.

F. Ducting

- ☐ HVAC approved ducting.
- ☐ Calculated length of duct no greater than maximum allowed.
- ☐ UL Certified terminations (For ducting to the outside).
- ☐ Insulated duct.
- ☐ Ducting adequately supported.
- ☐ Ducting adequately isolated from structure.

G. Shutoff Valve

- ☐ Make sure valve is open condition .

H. Leak Sensor

- ☐ Make sure sensor is dry and doesn't touch the water during installation.

Operating the water heater

⚠CAUTION: Hydrogen gas can be produced in a hot water system served by this water heater that has not been used for a long period of time (generally two weeks or more). **HYDROGEN GAS IS EXTREMELY FLAMMABLE!!** To dissipate such gas and to reduce risk of injury, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipe as the water begins to flow. **DO NOT** smoke or use an open flame near the faucet at the time it is open.

Safety Precautions

- A** Disconnect all power to water heater if it has been subjected to over heating, fire, flood, physical damage.
- B** **DO NOT** turn on water heater unless it is filled with water.
- C** **DO NOT** turn on water heater if cold water supply shut-off valve is closed.
- D** If there is any difficulty in understanding or following the Operating Instructions or the Care and Cleaning section, it is recommended that a qualified person or serviceman perform the work.

⚠WARNING: If the water heater has been subjected to fire, flood or physical damage, disconnect all power to water heater, and **DO NOT** operate the water heater again until it has been checked by a qualified service technician.

NOTICE: **DO NOT** use this appliance if any part has been under water. Immediately call a qualified installer or service agency to replace a flooded water heater. **DO NOT** attempt to repair the unit! It must be replaced.

Safety Controls

The water heater is equipped with a temperature limiting control (ECO) that is located above the upper heating element in contact with the tank surface. If for any reason the water temperature becomes excessively high, the temperature limiting control (ECO) breaks the power circuit to the heating element. Once the control opens, it must be reset manually.

⚠CAUTION: The cause of the high temperature condition must be investigated by qualified service technician and corrective action must be taken before placing the water heater in service again.

To reset the temperature limiting control: (Refer to Illustration in Cavity Insert section):

- 1** Disconnect all power to unit before starting maintenance.
- 2** Remove the upper cavity cover and insulation.
- 3** Press the red RESET button.
- 4** Replace the insulation, jacket access panel and plastic housing before turning on the power to the water heater.

⚠DANGER: There is a hot water scald potential if the thermostat is set too high. Households with small children, disabled, or elderly persons may require a 120°F (49°C) or lower thermostat setting to prevent contact with HOT water.

Water Temperature Setting

The temperature of the water in the water heater can be regulated by selecting the desired temperature on control display. Safety and energy conservation are factors to be considered when selecting the water temperature setting of the water heater. The lower the temperature setting, the greater the savings in energy and operating costs.

To comply with safety regulations the temperature is factory set at 120°F (49°C) or less where local codes require. This is the recommended starting point. Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. Be sure to read and follow the warnings outlined in this manual and on the label on the water heater. This label is located on the front of the water heater.

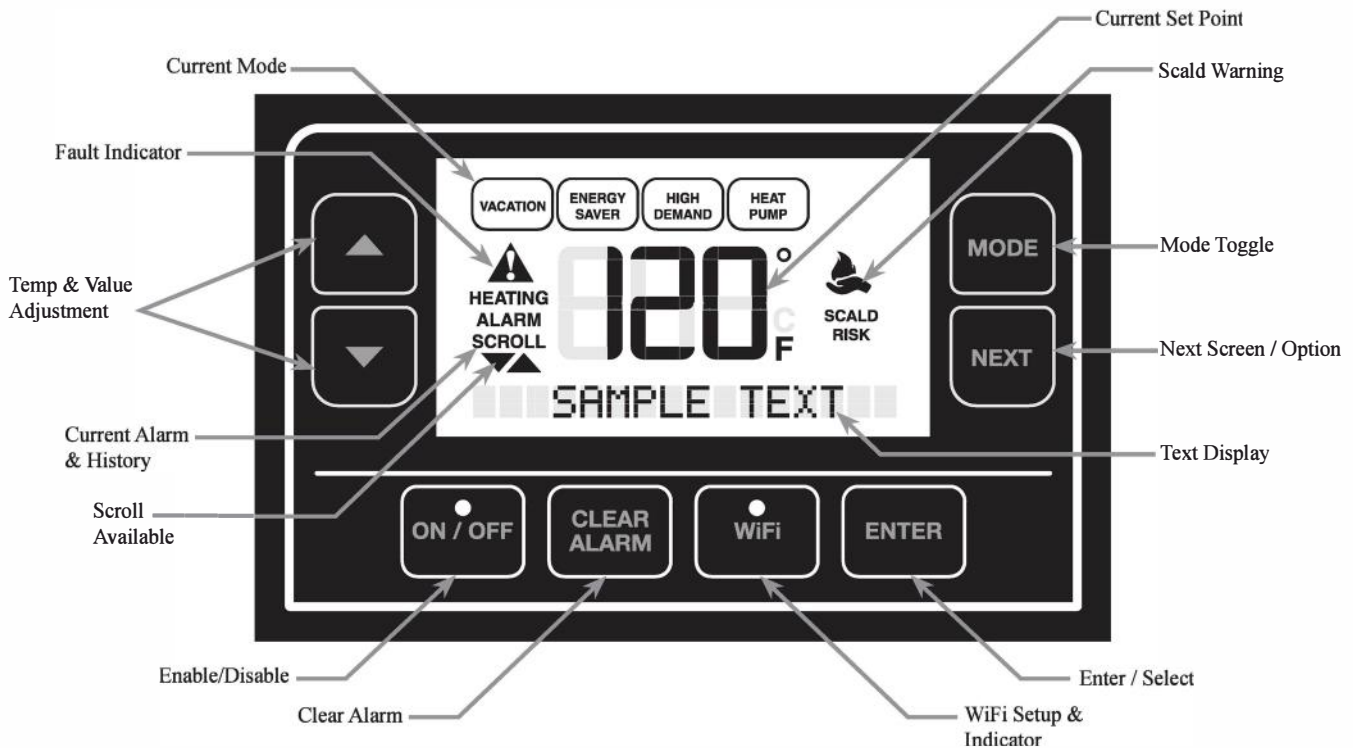
Mixing valves are recommended for reducing point of use water temperature by mixing hot and cold water in branch water lines. It is recommended that a mixing valve complying with the Standard for Temperature Actuated Mixing Valves for Hot Water Distribution Systems, ASSE 1017 be installed. See page 3 for more details and contact a licensed plumber or the local plumbing authority for further information.

When used in demand response applications a thermostatic mixing valve conforming to ASSE 1017 shall be installed on the hot water supply line following all manufacturer installation instructions. See page 32 for additional installation information.

The chart on the page 3 may be used as a guide in determining the proper water temperature for your home.

Local Startup

User Interface



ICONS show the current state of the entire system.

1. **Current Mode** - Illuminated when the system is working on the corresponding mode.
2. **Wi-Fi Indicator** - Illuminated when the display detects valid connection to a Wi-Fi network. Blinking when in provisioning mode.
3. **Fault Indicator** - Illuminated when the display detects OBJECT codes ALMCODE 1, 2, 3 or 4 is greater than "0". This indicates the Control Board has detected either an Alarm or an Alert.
4. **Scroll Available Indicator** - Illuminated when the display detects the Up/Down arrows are enabled to scroll.
5. **Scald Warning** - Illuminated when the display detects potential scalding water temperatures. Use water at own risk.
6. **Enable/Disable Indicator** - Illuminated when the display is Enabled (ON).

Local Startup

Enabling / Disabling Unit



- 1) Press the "ON/OFF" button to turn on / enable unit.

*Unit will be disabled upon initial startup.



- 2) Press the "ON/OFF" button to turn off/disable the unit.

Adjusting Temperature



*Scald warning will automatically appear at 120°F and higher.

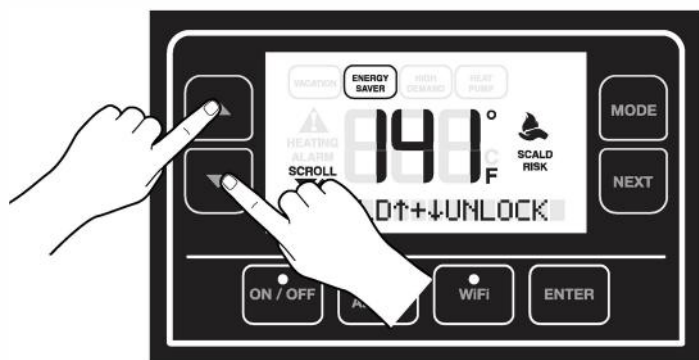
- 1) Press the "UP" button to increase temperature.



*Scald warning will automatically appear at 120°F and higher.

- 2) Press the "DOWN" button to decrease temperature.

High Temperature Enabling



Enable high temperatures (+140°) by pressing and holding both "UP" and "DOWN" buttons for 3 seconds when temperature is set to 140°F.

*Maximum Temperature: 150°F (65°C). High Temperature Setting will be disabled after 5 minutes if the user decreases the temperature below 140°F (60°C).

Lock/Unlock Display

- Press and hold for 5 seconds both UP and DOWN buttons to Lock/Unlock the Display. This prevents any change in Mode of operation or set-point if any button is pressed.

Change Mode of Operation



Press the "MODE" button to select operating mode.

Modes of Operation

- Energy Saver
- High Demand
- Heat Pump
- Electric
- Vacation

Mode	Efficiency	Recovery
Electric	Very Low	Fast
Heat Pump	High	Very Slow
High Demand	Low.	Very Fast
Energy Saver	Very High.	Fast
Vacation	Very High	None

Setting Menu



Press the "NEXT" button to access the settings.

Keep pressing "NEXT" button to scroll through the following menu items:

1. ALARM BEEP: Enable/Disable Alarm Sound.
 - a. Use the Up/Down arrows to change from Yes (Default) to No sound.
2. TEMP DISPLAY: Change the temperature units (°F or °C).
 - a. Use the Up/Down arrows to change from F° (Default) to °C.
3. CURRENT ALARMS
 - a. Use the Up/Down arrows to scroll through the current alarms.
 - b. To clear alarms press the Clear Alarm button.
4. ALARM HISTORY
 - a. Use the Up/Down arrows to scroll through the alarm history.
5. CLEAR HISTORY
 - a. Press ENTER to clear alarm history.
6. MAC ADDRESS: WiFi MAC Address.
7. NETWORK INSTANCE: Instance of the current unit.
 - a. Use the Up/Down arrow to change Network Instance if needed.
8. SOV INSTALLED:
 - a. A Shut-Off Valve (SOV) is installed? - This will say yes if a SOV is installed.

Local Startup

WiFi Setup

1. Press, hold for 5 seconds and release the WiFi button.
2. WiFi LED will start to blink when it is ready to start WiFi setup.
3. WiFi signal will start to broadcast for 30 minutes and user can use EcoNet Application to setup WiFi.
4. If setup is not completed in the next 30 minutes, WiFi will stop broadcasting. User should perform these steps again to re-start WiFi setup.
5. Once correctly connected, LED will turn solid blue.



WiFi Soft Reset

If WiFi needs to be reseted while keeping the same WiFi login information:

1. Press, hold for 3 seconds and release the WiFi button. 1 beep will be heard.
2. WiFi will try to re-connect to the same network that was configured previously.

WiFi Hard Reset

If WiFi needs to be reset because there is a new network to be used:

1. Press, hold for 5 seconds and release the WiFi button. 3 beeps will be heard.
2. Follow the same steps as in WiFi Setup section.

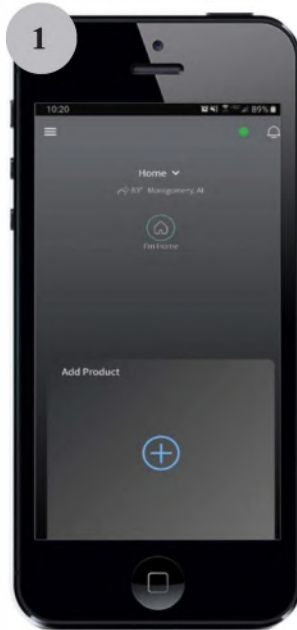
EcoNet App

EcoNet App 2.0 Instructions

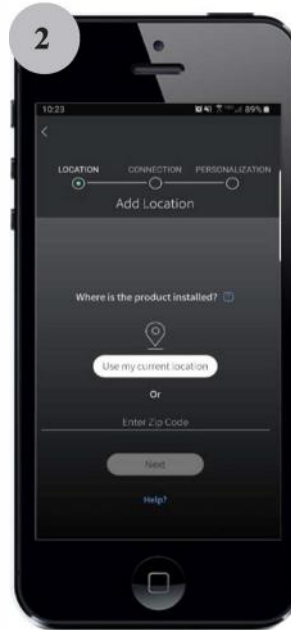


EcoNet®

Download EcoNet app and create profile



1
Open and log into your EcoNet app and select the “Add Product” option on the main equipment screen.



2
Add a location by either selecting “Use my current location” or entering your zip code, then hit “Next”.

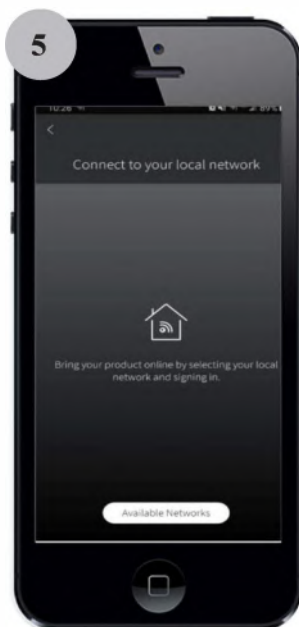


3
Place your Water Heater in WiFi setup and click the “Continue” button.



4
Select your WiFi module’s mac address from the network list. You can find your MAC address in the Water Heater WiFi menu

EcoNet App



Return to the app, where you should see the following screen. Click “Available Networks”.



Select your router and enter your password. Click “Connect”.

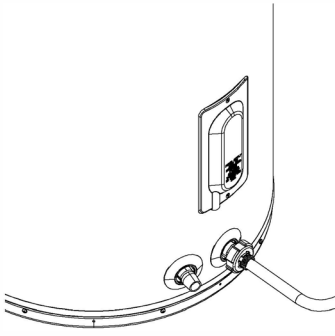


The app should proceed to provision your WiFi module using a secure connection. You should see message shown in the image on the left.



Once connected, product home screen will be displayed

Care and cleaning of the water heater



Draining the Water Heater

⚠CAUTION: Shut off power to the water heater before draining water.

⚠DANGER: Before manually operating the relief valve, make certain no one will be exposed to the hot water released by the valve. The water drained from the tank may be hot enough to present a scald hazard and should be directed to a suitable drain to prevent injury or damage.

In order to drain the water heater, turn off the cold water supply. Open a hot water faucet or lift the handle on the relief valve to admit air to the tank.

Attach a garden hose to the drain valve on the water heater and direct the stream of water to a drain. Open the valve.

⚠DANGER: Before manually operating the relief valve, make certain no one will be exposed to the danger of coming in contact with the hot water released by the valve. The water may be hot enough to create a scald hazard. The water should be released into a suitable drain to prevent injury or property damage.

NOTICE: If the temperature and pressure relief valve on the water heater discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or your plumbing contractor on how to correct this. **DO NOT** plug the relief valve outlet.

Routine Preventative Maintenance

Properly maintained, your water heater will provide years of dependable trouble-free service.

It is suggested that a routine preventive maintenance program be established and followed by the user.

Most electrical appliances, even when new, make some sound when in operation. If the hissing or singing sound level increases excessively, Contact a qualified installer or plumbing contractor to inspect.

IMPORTANT: See "DANGER on left". At least once a year, lift and release the lever handle on the temperature pressure relief valve, located on the side of the water heater, to make certain the valve operates freely. Allow several gallons to flush through the discharge line to an open drain.

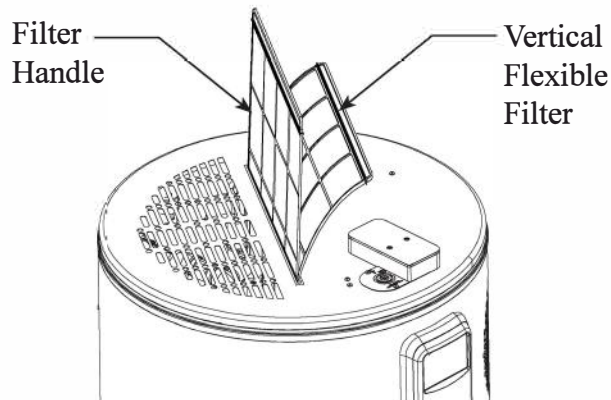
It is recommended to clean the filter on top of the heat pump when "Clean filter reminder" alert appears. Clean by washing with mild detergent and

water. Dry and replace. Remove the filter by lifting up, then replace by lowering back into the filter slot on top of the unit. See Figure below.

At least once a year pour a cup of bleach in the access opening of the condensate drain to kill any algae, mold, or mildew that has formed in the pipe. Ensure the condensate can flow freely; unclog if needed.

A water heater's tank can act as a setting basin for solids suspended in the water. It is therefore not uncommon for hard water deposits to accumulate in the bottom of the tank. It is suggested that a few quarts of water be drained from the water heater's tank every month to clean the tank of these deposits.

Rapid closing of faucets or solenoid valves in automatic water using appliances can cause a banging noise heard in a water pipe. Strategically located risers in the water pipe system or water hammer arresting devices can be used to minimize the problem.



Care and cleaning of the water heater

Vacation and Extended Shut-Down

NOTICE: Refer to the Hydrogen Gas Caution in the Operating Instructions.

If the water heater is to remain idle for an extended period of time, the power and water to the appliance should be turned off to conserve energy and prevent a build-up of dangerous hydrogen gas.

The water heater and piping should be drained if they might be subjected to freezing temperatures.

After a long shut-down period, the water heater's operation and controls should be checked by qualified service personnel. Make certain the water heater is completely filled again before placing it in operation.

Anode Rod

NOTICE: DO NOT remove the anode rod from the water heater's tank. Operation with the anode rod removed will greatly shorten the life of the glass lined tank and will exclude warranty coverage.

This water heater is equipped with an anode rod designed to prolong the life of the glass-lined tank. The anode rod is slowly consumed, thereby eliminating or minimizing corrosion of the glass-lined tank.

Water sometimes contains a high sulfate and/or mineral content and together with cathodic protection process can produce a hydrogen sulfide, or rotten egg odor in the heated water. Chlorination of the water supply should minimize the problem.

Before You Call For Service...



Troubleshooting Tips

Save time and money! Review the chart on this page first and you may not need to call for service.

Problem	Possible Causes	What to Do
Rumbling noise	Water conditions in your home caused a build up of scale or mineral deposits in the water heater.	<ul style="list-style-type: none"> ● Allow a few quarts of water to run from drain valve to remove sediment settlings.
Relief valve producing popping noise or draining	Pressure build up caused by thermal expansion in a closed system	<ul style="list-style-type: none"> ● This is an unacceptable condition and must be corrected. Contact the water supplier or plumbing contractor on how to correct this. DO NOT plug the relief valve outlet
Not enough or no hot water	Water usage may have exceeded the capacity of the water heater.	<ul style="list-style-type: none"> ● Wait for the water heater to recover after an abnormal demand
	A fuse is blown or a circuit breaker tripped	<ul style="list-style-type: none"> ● Replace fuse or reset circuit breaker
	Electric supply may be off	<ul style="list-style-type: none"> ● Confirm electric supply to water heater and see installation section of this manual.
	The thermostat may be set too low.	<ul style="list-style-type: none"> ● See the Temperature regulation of the water heater section of this manual
	Leaking or open hot water faucets	<ul style="list-style-type: none"> ● Make sure all faucets are closed
	Electric service to your home may be interrupted	<ul style="list-style-type: none"> ● Contact the local electric utility.
	Improper wiring.	<ul style="list-style-type: none"> ● See the Installing the water heater section of this manual.
	Manual reset limit (ECO)	<ul style="list-style-type: none"> ● See the Temperature regulation of the water heater Refer to page 3 for more information.
	Cold water inlet temperature may be colder during the winter months	<ul style="list-style-type: none"> ● This is normal. The colder inlet water takes longer to heat.
	Not enough air exchange for Efficient Heat Pump Operation.	<ul style="list-style-type: none"> ● If air temperature drops more than 15°F (8°C) during Heat Pump Operation, more air circulation around heater is needed.
Water is too hot	The thermostat is set too high.	<ul style="list-style-type: none"> ● See the Temperature regulation of the water heater section of this manual


⚠ CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, thermostats, heating elements or other safety devices. Refer repairs to qualified service personnel.

Troubleshooting Alarm Codes



Troubleshooting Tips

Save time and money! Review the charts on this section first and you may not need to call for service.

The water heater will make an audible beep for notification of Alarms and  icon. The following steps should be used in determining the Alarm code:

- 1) Press "Next" button until "Current Alarm" is visible.



- 2) Press "Down" arrow button to scroll through the active alarms.



Code	Troubleshooting Guide	Possible Causes	What to Do
A004	Comp.Shutdown: Discharge-Suction Trip	Heating source defaults to elements due to compressor malfunction	1. Confirm fan is operational while compressor is on. (If the fan is not operational, check continuity from middle(ground)terminal to either outside terminal. If there is a 60V or higher reading, the fan should be running and will need to be replaced. If not, replace the control board (rare)). 2. Confirm filter screen is clean. 3. Inspect compressor and surrounding components for any obvious signs of refrigerant leak (oily residue) If the compressor is not operational or there are signs of leakage, the unit will need to be replaced as we do not service sealed system parts.
A005	Compressor Shutdown: Discharge Temp High		
T005	Compressor Shutdown: Discharge Temp High	Heating source defaults to elements due to low airflow	
A006	Suction Temperature Too Low	Heating source defaults to elements due to compressor malfunction	
T006	Suction Temperature Too Low		
A008	Detected Dry Fire Condition	Dry fire protection- Not sufficient water in storage tank: Heater disabled	1. Fill storage tank with water. 2. Purge all air from the storage tank by running a hot water faucet (This is generally an installation issue and indicates there is air in the tank.) If the unit is still displaying the A008, air is still present and should be purged again. Any issues with the board or sensors would exhibit a different alarm code.
T009	Compressor wiring may be faulty	Heating source default to elements due to compressor malfunction	1. Check connections of the wiring and sensors. 2. Get an Ohm reading on the thermistors (if multimeter is available) (See Ohm chart for correct readings based on ambient temperature). 3. Check on display by selecting Service-->Sensors-->If sensor shows - 40°F, the circuit is open. +250°F indicates the circuit has shorted. Note: To confirm reading, power down the unit and unplug the thermistor from the board. Check Ohm reading. (See ohms chart)
A009	Compressor wiring may be faulty		
A101	Suction Temperature Sensor Failure	Heating source defaults to elements due to heat pump temperature sensor malfunction	
A102	Ambient Temperature Sensor Failure		
A103	Lower Heater Temp Sensor Failure	Lower tank temperature sensor malfunction. Heater disabled.	
A104	Upper Heater Temp Sensor Failure		
A105	Evaporator Temp Sensor Failure	Heating source defaults to elements due to heat pump temperature malfunction.	
A106	Discharge Temp Sensor Failure		
A107	Water Detected on Floor: Check For Leaks	Water is detected in the drain pan	1. Check for obvious water leaks (If leak is present, service for unit leakage). 2. If obvious leakage is not present, disconnect rope sensor from the board and if the code is no longer present, dry (a blow dryer is an acceptable method) or replace rope sensor. 3. If error is still present once the rope sensor has been replaced, the board will need to be replaced. 4. Press and hold the "Clear Alarm" button for 5 seconds to override the alarm for 24 hrs.
A108	Condensate Blocked: Unclog Line	Heating source defaults to elements due to condensate drain blockage	1. Remove top cover from tank 2. Visually inspect to ensure condensate line is clear and there is not excessive condensate in condensate pan 3. If water is present, locate blockage and unlock. 4. Ask customer to where the condensate is being routed 5. If pan is dry and no blockage is present, replace condensate sensor.

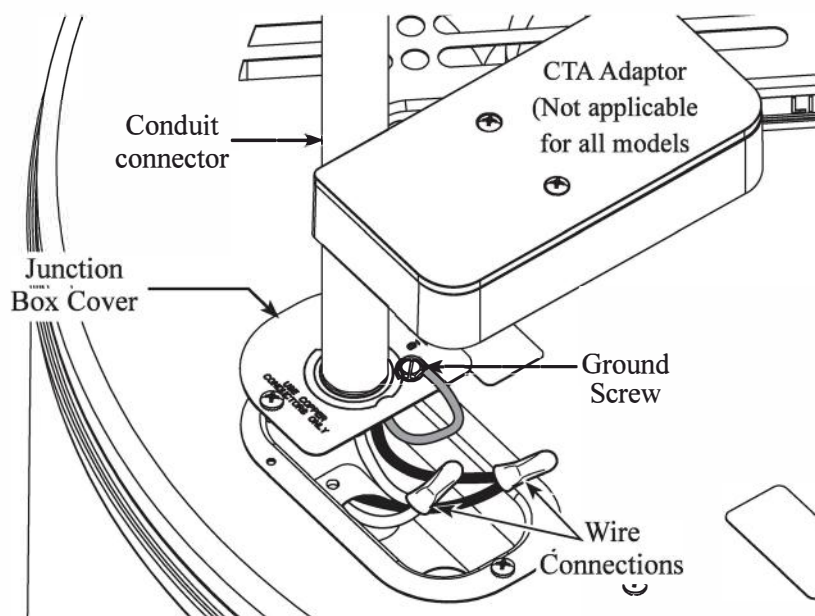
Troubleshooting Alarm Codes

Code	Troubleshooting Guide	Possible Causes	What to Do
A125	Lower Element Error or Relay Stuck Closed	Heating element or control board failure. Heater disabled.	Disconnect power to unit 2. Check resistance on element per included Ohm Reading Chart 3. If acceptable ohm reading is present, replace board 4. If ohm reading is not as it should be per included chart, replace
A126	Upper Element Error or Relay Stuck Closed		
A127	Element Wire Routing Error	Elements mis-wired or control board failure. Heater disabled.	<ol style="list-style-type: none"> 1. Disconnect power to unit. 2. Check wiring connection to heating element. 3. Ensure both wires are properly connected at element and board. 4. Check ohm reading on heating element if wires are properly connected. 5. Of acceptable ohm reading is present, replace board. If not, replace element.
A128	Lower Element Relay Failure to Close Error	Control board relay failure. Heater disabled.	<ol style="list-style-type: none"> 1. Disconnect power to unit. 2. Check wiring connection. 3. Check ohm reading if wires are properly connected. 4. Of acceptable ohm reading is present, replace board. If not, replace relay.
A129	Upper Element Relay Failure to Close Error		
A130	Unit Off/Air Temp Freezing: Enable Unit	Ambient temperature is below freezing. --FREEZE WARNING	Select mode to enable heater (Turn it on).
T131	Clean Filter Reminder	Air filter routine maintenance reminder	<ol style="list-style-type: none"> 1. Set mode to Electric or OFF. 2. Remove air filter and clean by washing with a mild detergent. 3. Dry air filter and reinstall. 4. Set unit to desired mode.
T132	Water Heater difficulty satisfying demand	Water heater can not satisfy demand	<ol style="list-style-type: none"> 1. Check for open faucets. 2. Check for water leaks. 3. If none present, unit may be improperly sized.
A120	Shutoff Valve Can't Close Error	Shut-Off Valve malfunction	<ol style="list-style-type: none"> 1. Check connections of the wiring. 2. Unplug and plug back the Shut-Off valve. 3. If alarm persist, call customer service.
A121	Shutoff Valve Can't Open Error		
A122	Shutoff Valve Inputs in Error		
A123	Shut-Off Valve Not Installed		
A200	High Water Temp! [ECO] Call Tech Service	ECO Tripped. Heater Disabled	<ol style="list-style-type: none"> 1. Disconnect power to unit. 2. Check elements from screw to ground. 3. Check resistance to thermistors. 4. If the issue is neither the elements or thermistor, replace board.
T300	Water Leak Sensor Not Installed	Water Leak Sensor Not Installed	<ol style="list-style-type: none"> 1. Check to ensure water leak sensor is installed. 2. Check wiring connections to sensor from board. 3. Check resistance to sensor to determine whether sensor or board should be replaced (See ohm reading chart for correct readings).

Code	Troubleshooting Guide	Possible Causes	What to Do
A502	Time Clock needs to be programmed	Controller malfunction. Heater disabled.	Replace Control Board
A503	Time Clock not advancing time properly		
T504	WiFi Chip Communication Error		
A900	Controller Fault: Call Tech Service		
T901	Controller Fault: Call Tech Service		
A902	Controller Fault: Call Tech Service		
A903	Controller Fault: Call Tech Service		
A904	Controller Fault: Call Tech Service		
A905	Controller Fault: Call Tech Service		
A906	Power Board Temp. Protection Sensor Failure	Controller getting too hot.	

CTA Module Wiring

Water Heater Junction Box



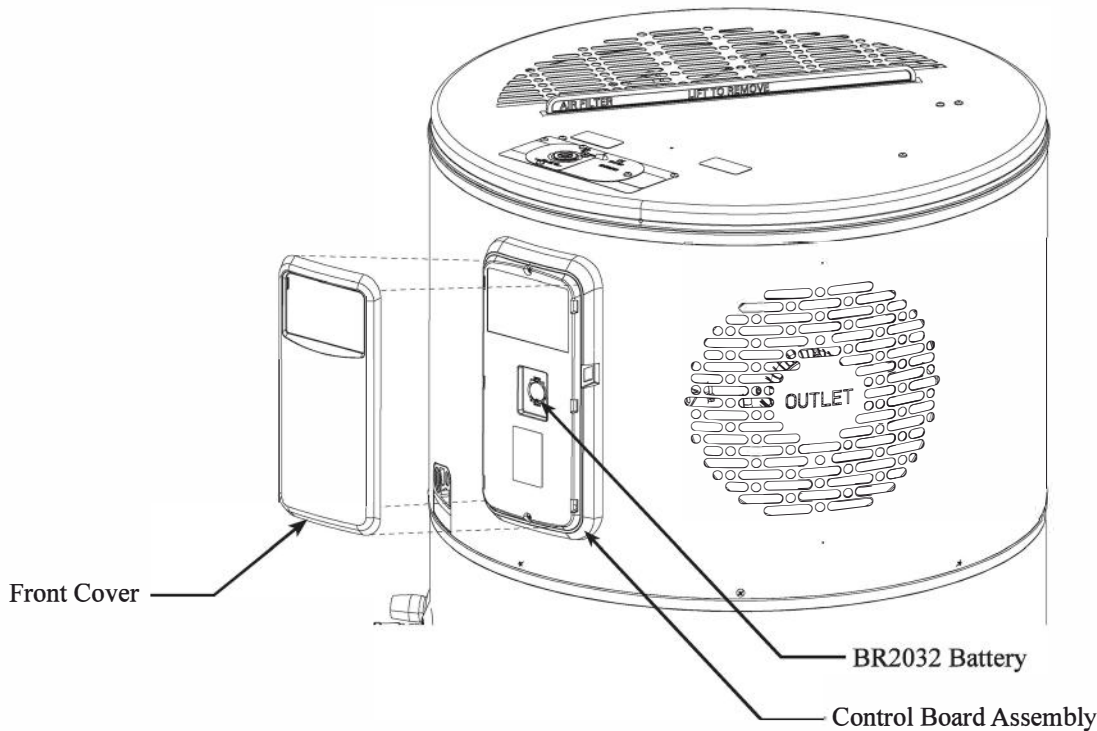
A separate branch circuit with copper conductors, overcurrent protective device and suitable disconnecting means must be provided by a qualified electrician.

All wiring must conform to local codes or latest edition of National Electrical Code ANSI/NFPA 70.

1. Use an appropriately sized wire nut to connect the Red wire of the CTA module box to the Red wire of the Water Heater connection.
2. Use an appropriately sized wire nut to connect the Black wire of the CTA module box to the Black wire of the Water Heater connection.
3. Use the ground screw to connect the green wire of the CTA module box to ground.
4. The water heater is completely wired to the junction box inside jacket at the top front of the water heater.

***Note: A CTA2045 compliant Module can be connected to the water heater's top connector. Follow the instructions from the CTA2045 Module supplier to connect.**

JA13 Offline Schedule Setting & Battery Replacement



Before uploading and enabling JA13 offline schedule (*Utility Contractor Only*):

1. Power ON Water Heater.
2. Press, hold for 5 seconds and release the WiFi button.
3. WiFi LED will start to blink when it is ready to start WiFi setup.
4. WiFi signal will start to broadcast for 30 minutes and user can use the EcoNet Contractor Portal and Contractor Application to setup JA13 Offline Schedule.
5. If setup is not completed in the next 30 minutes, WiFi will stop broadcasting. User should go to these steps again to re-start WiFi setup.
6. Once setup is completed, the Demand Response Icon will light up which will indicate the Water Heater is following a schedule.

To override JA13 offline schedule:

1. The user can override the JA13 offline schedule for 72 hrs by pressing the MODE button and changing the Mode of operation of the water heater to the user desired Mode and set-point.
2. Once the user override Time elapses, the Demand Response will continue to follow the predetermined schedule.
3. To completely opt-out from JA13 scheduling, contact your utility company.

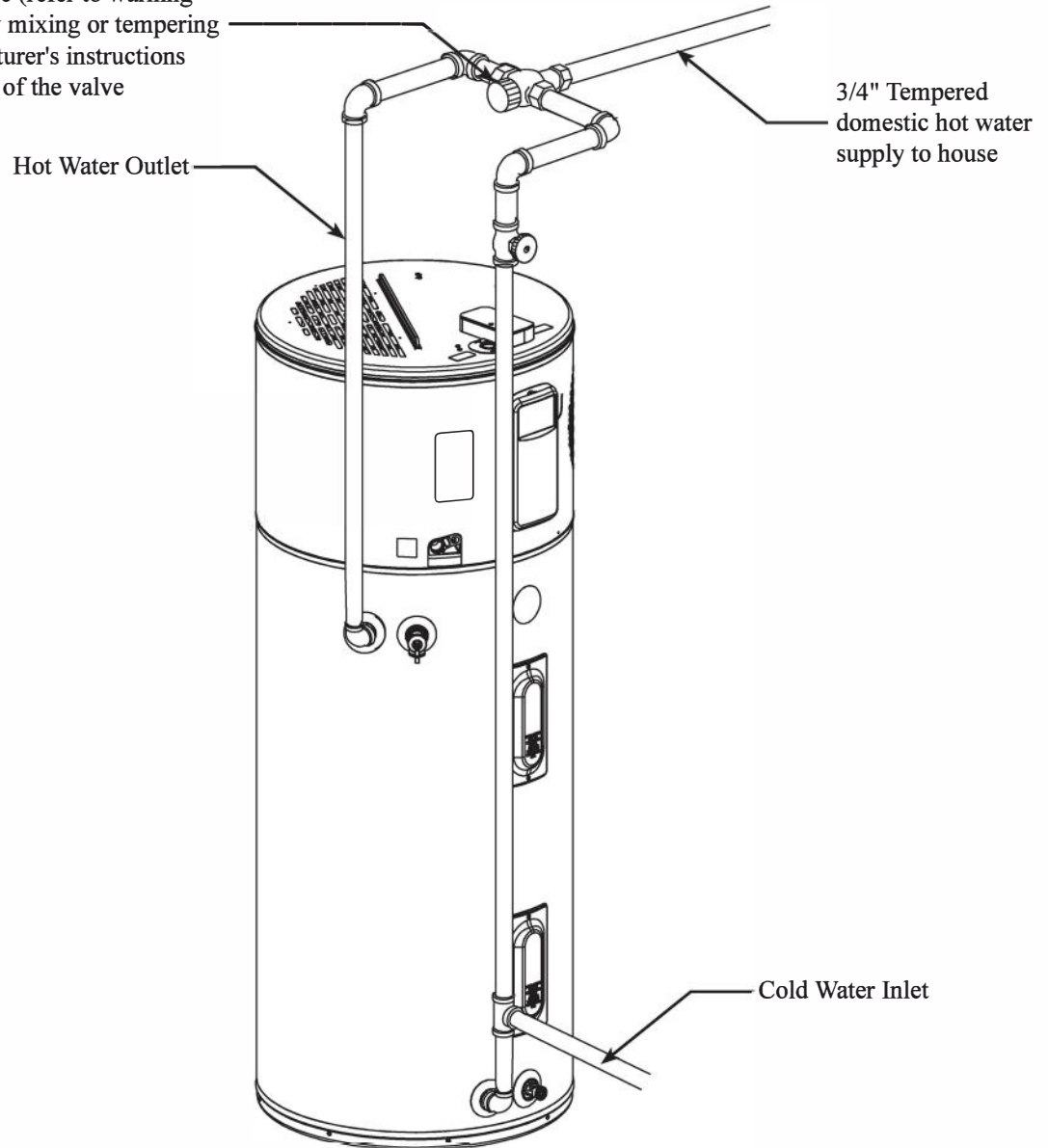
To replace the battery follow these steps:

1. Remove the front cover of the Control assembly.
2. Remove the BR2032 battery from the battery holder.
3. Replace the battery with an approved BR2032 cell coin battery.
4. Re-Install the front cover of the Control assembly.

Demand Response (CTA-2045/JA13) Installations

A thermostatic mixing valve conforming to ASSE 1017 shall be installed on the hot water supply line following all manufacturer installation instructions.

Nominal 3/4" size mixing or tempering valve (refer to warning above). Follow mixing or tempering valve manufacturer's instructions for installation of the valve



Replacement Parts.

Instructions For Placing a Parts Order

Address parts orders to the distributor or store where the heater was purchased.

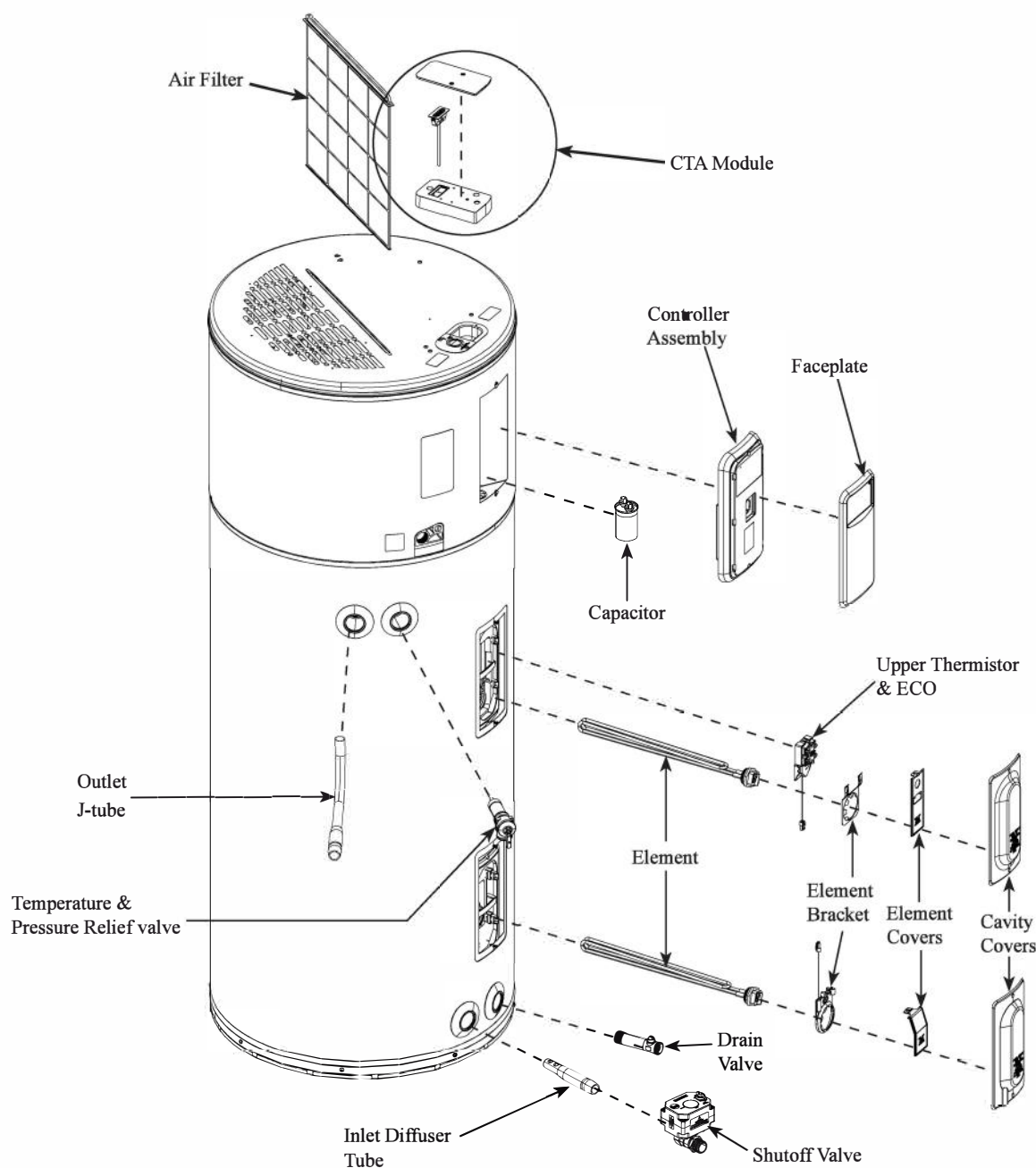
All parts orders should include:

- 1 The model and serial number of the water heater from the rating plate located on the tank jacket.
- 2 Specify voltage and wattage as marked on the rating plate.
- 3 Part description (as noted below) and number of parts desired.

***NOTICE:** Check the water heater's rating label on the front of the unit for the acceptable element wattage.

⚠CAUTION: For your safety **DO NOT** attempt repair of electrical wiring, heating elements, heat pump or electronic controls. Refer repairs to qualified service personnel.

⚠WARNING!
FLAMMABLE CONTENTS UNDER PRESSURE. The compressor is not a serviceable part. The compressor wiring terminals may arc allowing pressurized refrigerant and oil to escape, ignite and cause serious bodily injury, severe burns or death.



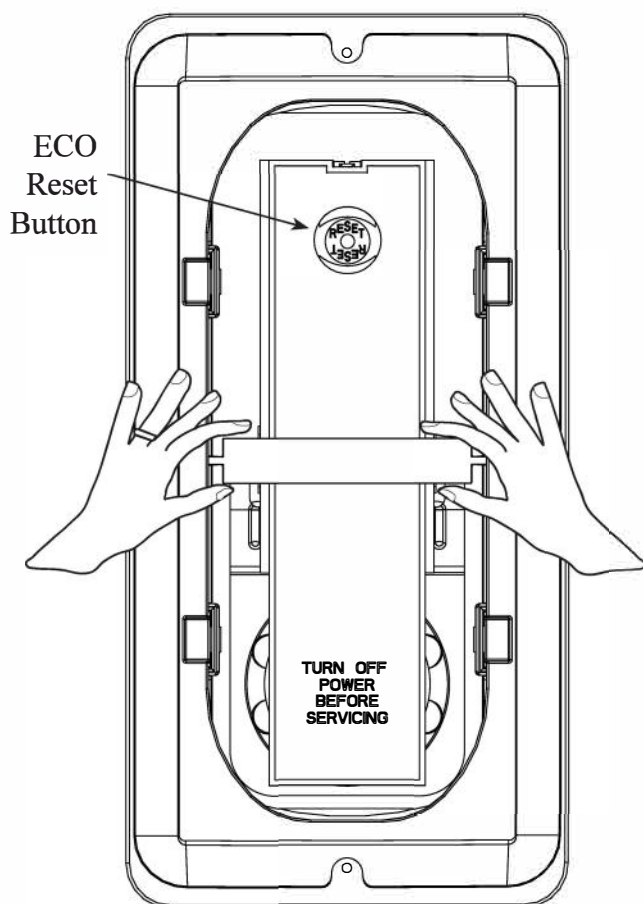
Replacement Parts.

Part Number	Description
AP20142	Air Filter
AP11526S-2	Anode
AP11526T-2	
AP11526W-2	
AP20205	Capacitor (15 uf)
AS48043	Cavity Cover
AS38409-1AE	
AS48043-AE	
AP16602	Cavity Cover Foams
AP20947A	Characterization Plug - HPWH
AP20947B	
AP20947C	
AP20947D	
AS48812	CTA
AP17940-1	Condense Sensor
AP20946	
AP21769	Controller assembly Gen V (without battery)
AP20624	Cover CTA
AP20625	
AS48692	Cover Junction
AS48693	
AP20612	Cover Lower Element
AP21098	Current Sensing Transformer
AP15182-1	Cover-Thermostat HPWH
AP16800D	Drain Valve
AP16830D	
AP18708JL	Element 2.25Kw

Part Number	Description
AP10869ML-7	Element 4.5KW
AS48782	Fan Assembly
AP17392-2	Gasket
AP6708-9	
AP17552-1	
AP21208	
AP13448A	Inlet Diffuser Tube
AP16581A	
AP21365	Inlet Duct Adapter
AP20620	Motor
AP20519	
SP17829	Outlet Duct Adapter
AP8878N-1	Outlet Tube
AP19147C	PFW Sensor Wick
AP19147D	PFW Sensor Wick
AP13920-4	Plug - 3/4 in. NPT
AP18087	Thermistor
AP18944C	Rope Water Sensor
AP18944D	
AP19134	Rope Water Sensor 2 FT (HPWH)
AP14837G	T&P Valve
AP20439	Thermistor Bracket
AS23557	Thermostat Bracket
AP20180	Shutoff Valve
AP20590	Wire Harness
AS48675	
AP20584	
AP20509	

Cavity Insert Instructions

The following instructions are intended for qualified service personnel **ONLY**, and should only be done when necessary.



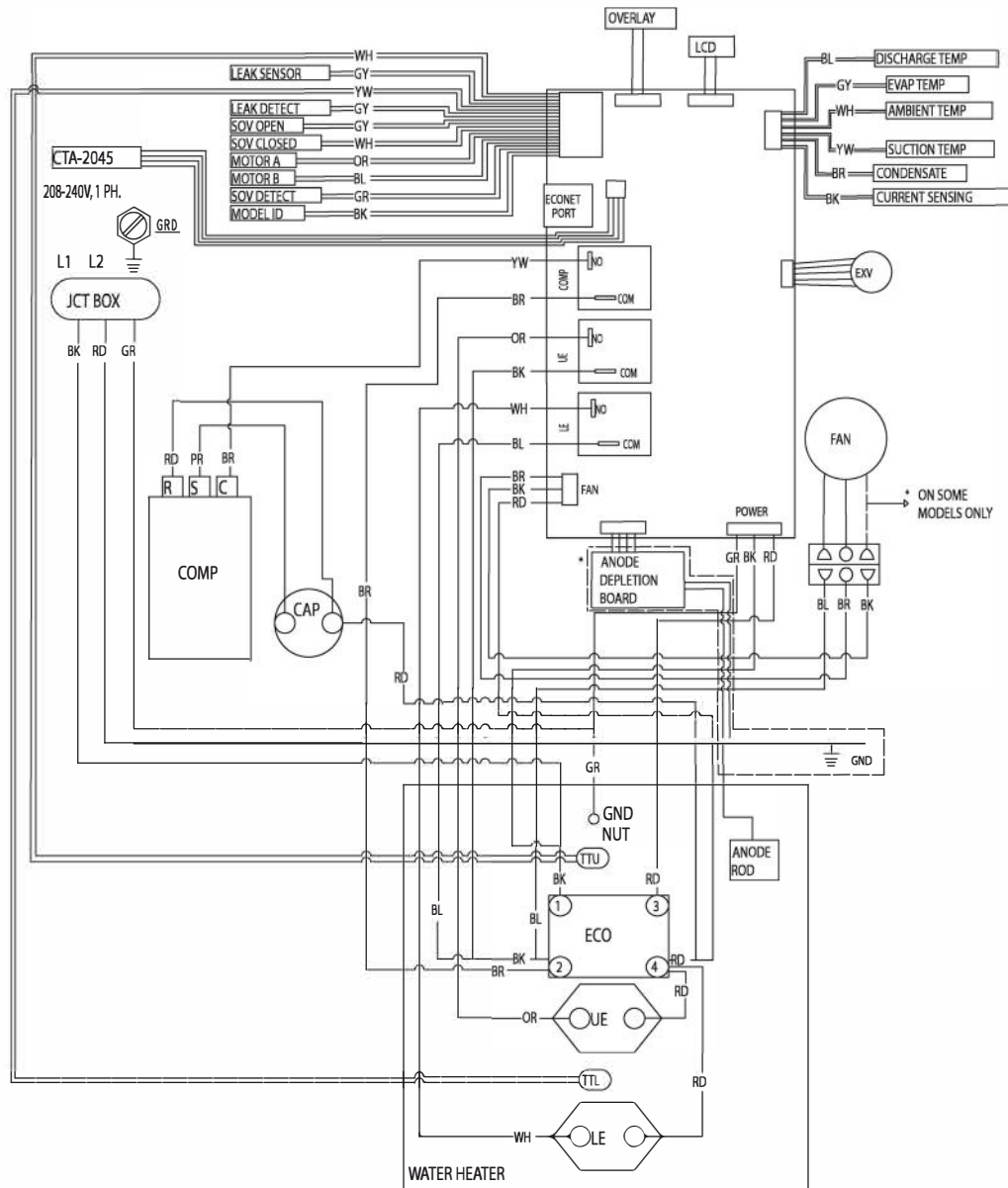
In order to replace the ECO,thermistor or heating element, remove the cavity insert crossbar by following the instructions below:

- 1 Disconnect all power to unit before to starting maintenance.
- 2 Remove the jacket access panel(s) and insulation.
- 3 Rotate the crossbar up and down until it breaks away from the remainder of the cavity insert.
(See illustration to the left)
- 4 Discard the crossbar. It cannot and need not be replaced.

Replace the ECO,thermistor and/or element as necessary.
- 5 Replace the insulation, jacket access panel(s) and plastic housing before turning on the power to the water heater.

NOTICE: The cavity insert crossbar is necessary for the manufacturing process only. The removal of the crossbar will not interfere with the operation of the water heater.

Wiring Diagram



COMPONENT CODE

AT	AMBIENT TEMPERATURE
CAP	CAPACITOR
COMP	COMPRESSOR
COND	CONDENSATE SENSOR
DT	DISCHARGE TEMPERATURE
ECO	EMERGENCY CUT OFF
ET	EVAPORATOR TEMPERATURE
EXV	ELECTRONIC EXPANSION VALVE
FAN	FAN
GND	GROUND NUT ON TANK
NUT	
JCT	JUNCTION BOX
BOX	
LE	LOWER ELEMENT
LEAK	LEAK SENSOR
PCB	PROGRAMMED CONTROL BOARD
SOV	AUTOMATIC SHUT OFF VALVE
ST	SUCTION TEMPERATURE
TB	TERMINAL BLOCK
TTL	TANK TEMPERATURE - LOWER
TTU	TANK TEMPERATURE - UPPER
UE	UPPER ELEMENT
CS	CURRENT SENSING

WIRING INFORMATION

LINE VOLTAGE	
-FACTORY STANDARD	
-FACTORY OPTION	
-FIELD INSTALLED	
LOW VOLTAGE	
-FACTORY STANDARD	
-FACTORY OPTION	
-FIELD INSTALLED	
REPLACEMENT WIRE	
-MUST BE THE SAME SIZE AND TYPE OF	

WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

WIRE COLOR CODE

BK	BLACK
BR	BROWN
BL	BLUE
GR	GREEN
GY	GRAY
OR	ORANGE
PK	PINK
PR	PURPLE
RD	RED
WH	WHITE
YW	YELLOW

IF YOU NEED SERVICE



1. Should you have any questions about your new water heater, or if it requires adjustment, repair, or routine maintenance, it is suggested that you first contact your installer, plumbing contractor or previously agreed upon service agency. In the event the firm has moved, or is unavailable, refer to the telephone directory, commercial listings or local utility for qualified service assistance.

2. Should your problem not be solved to your complete satisfaction, you should then contact the Manufacturer's National Service Department at the following address:

800 Interstate Park Drive
Montgomery, Alabama 36109
Phone: 1-800-432-8373.

When contacting the manufacturer, the following information will be requested:

- a. Model and serial number of the water heater as shown on the rating label located on front of the water heater.
- b. Address where the water heater is located and physical location.
- c. Name and address of installer and any service agency who performed service on the water heater.
- d. Date of original installation and dates any service work was performed.
- e. Details of the problems as you can best describe them.
- f. List of people, with dates, who have been contacted regarding your problem.

3. Should you have any issue or need assistance with the WiFi Module/EcoNet App then contact the EcoNet Customer Service:

Phone: 1-800-255-2388
Website: www.Rheem.com/EcoNet

MARKETING SUPPORT

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eBuilt™ Retailer Marketing Support

eBuilt™ Banner

Hang this free 4' x 12' banner on a sidewall facing the road to drive traffic of eBuilt™ home visits. Visit <https://cmhmarket.com/ebuilt-banner/> or scan this QR code to request your banner. One banner limit per each home center location.



Authorized eBuilt™ Retail Partner Decal

Promote your status as an authorized eBuilt™ Retail Partner with this window decal. Sign your Retail Partner Addendum, register as a Zero Energy Ready Home partner by visiting <https://www.energy.gov/eere/buildings/partner-central> or scanning this QR code.



eBuilt™ Social Media Support

Easily promote eBuilt™ homes on your social media channels with these branded assets, including a content calendar with messaging, professional photography and videos. Visit <http://bit.ly/eBuiltMarketingSupport> or scan this QR code to access the social media kit.



eBuilt™ Retailer Marketing Support

eBuilt™ Videos

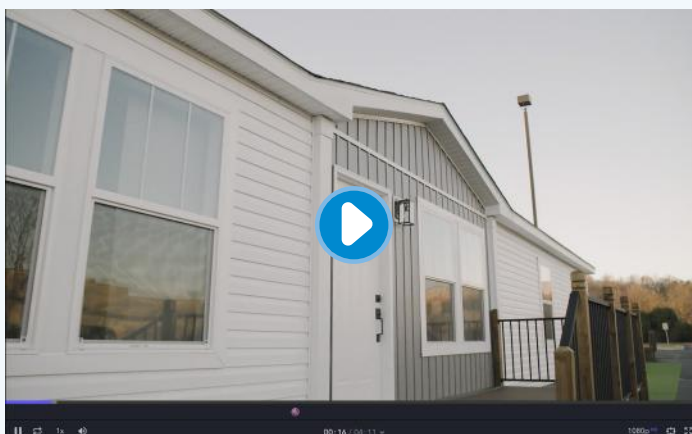
Hype Video

Build excitement about eBuilt™ homes with this fun hype video promoting the energy savings to homeowners. Visit <http://bit.ly/eBuiltMarketingSupport> or scan this QR code to access and download the hype video.



Promotional Home Tour Video

Add this eBuilt™ home tour video to your website, social media channels, lobby TV loop... wherever you want to promote the features and benefits of eBuilt homes! Visit <http://bit.ly/eBuiltMarketingSupport> or scan this QR code to access and download the promotional home tour video.



eBuilt™ Homeowner Education Materials



We've created flyers to help educate customers about eBuilt features and benefits. You can access these flyers by visiting <http://bit.ly/eBuiltMarketingSupport> or scanning the QR code. All materials can be downloaded, printed and shared with your sales team and customers. Copies are included in this section of your resource guide.

eBuilt™ Flyer with FAQ (electric)

Your Clayton eBuilt Home

- Solar-ready
- SmartControl™ by Carrier® HVAC heat pump
- Recessed hybrid heat pump water heater
- Apex gas hot water heater
- Insulated exterior doors
- Additional home insulation
- Recessed duct system
- Whole house ventilation system

SAVE MONEY on Energy Bills

eBuilt™ homes are more energy efficient, which can reduce your annual utility expenses by 40-50%. That adds up to substantial savings for you each year!

Average monthly energy costs comparison* between eBuilt™ homes and traditional non-eBuilt homes across the country:

Location	eBuilt™ Home	Traditional Home
Sacramento, CA	\$104.33	\$207.03
Phoenix, AZ	\$114.24	\$227.23
Dallas, TX	\$104.33	\$207.03
Knoxville, TN	\$114.24	\$227.23
Albany, NY	\$104.33	\$207.03

SCAN TO TAKE AN eBUILT™ HOME TOUR

eBuilt™ Flyer with FAQ (gas)

Your Clayton eBuilt Home

- Solar-ready
- SmartControl™ by Carrier® gas furnace
- Recessed hybrid heat pump water heater
- Apex gas hot water heater
- Insulated exterior doors
- Additional home insulation
- Recessed duct system
- Whole house ventilation system

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SCAN TO TAKE AN eBUILT™ HOME TOUR

eBuilt™ Home Features

eBuilt Home Features

Homes so energy efficient, you can save **40-50% on annual utility costs**

- Whole House Ventilation System
- Recessed Hybrid Heat Pump Water Heater
- Low-E Argon Gas Low-E Windows
- Insulated Exterior Doors
- Additional Insulation
- Recessed Smart Thermostat
- ENERGY STAR® Programmable Appliances
- SmartControl™ by Carrier® HVAC Heat Pump or Gas Furnace
- LED Lighting
- Solar-Ready

SCAN TO TAKE AN eBUILT™ HOME TOUR

Ready to Go Solar? Flyer

Ready to Go Solar?

Energy-efficient eBuilt™ homes can save you up to 40-50% on your power bill annually, and even more if you add a renewable solar energy system after purchasing your home. Adding solar panels converts your home into a "net-zero" home, which means your home can theoretically generate as much energy as it consumes.

Ready to take the next step with going solar? Here are some solar resources and information for your eBuilt™ home.

US Department of Energy Homeowner's Guide to Going Solar

The U.S. Department of Energy, in partnership with the Solar Energy Industries Association (SEIA), has created a thorough online homeowner's guide to going solar. This includes information about how solar works, how to start the process of adding solar to your home, solar savings and how to compare solar installation services. This site also provides information about tax incentives for solar investments.

Solar Installation Recommendations

- Ground insulation allows you to place the panels for optimal energy generation without impacting the structure of your home.
- Insulated roof ventilation from a rafter's air space can also potentially damage your roof, which would not be covered by your home warranty.

The U.S. Department of Energy recommends you partner with a reputable solar vendor certified by the Solar Energy Industries Association (SEIA).

SCAN TO ACCESS

eBuilt™ Video Library Flyer

eBuilt Homeowner Video Library

Our eBuilt™ Homeowner Video Library has helpful videos to demonstrate various maintenance items to ensure your home's optimal performance for years to come. We encourage you to watch these videos, as your home's unique construction and high-efficiency appliances require some maintenance and care items that may be new to you as a homeowner.

- eBuilt™ home tour video
- Recessed hybrid heat pump water heater
- SmartControl™ by Carrier® heat pump or gas furnace
- Whole house ventilation system
- Recessed smart thermostat
- Dehumidifier installation

eBuilt™ Homeowner Rebates

eBuilt Homeowner Rebates

ENERGY STAR®

As an eBuilt™ homeowner, you may be eligible for rebates on ENERGY STAR® certified products. To find out if you qualify, visit energystar.gov/rebate-finder or scan the QR code and follow these instructions:

- Enter your zip code in the search bar at the top of the page and click on the search button.
- Scroll down to see a list of available rebates in your area. You will need to scroll past rebates labeled "Featured," as these do not apply to new home purchases like your eBuilt™ home.
- Click on "Find out about the rebate" or "Learn more about this rebate."
- Follow the link provided in the email to learn more about that local rebate and application process. This process, if available, will require the following:
 - Utility account information (account number and name address)
 - Manufacturer and model number of the item for which you're seeking a rebate

Carrier® Smart Thermostat Rebate

Every eBuilt™ home includes an eBuilt™ smart thermostat, and homeowners in some areas may qualify for rebates and incentives. Visit energystar.gov/rebate-finder or scan the QR code to learn if you qualify.

Energy Management Rebates for Hybrid Water Heaters

Some homeowners in 15 states may qualify for rebates on their water heaters. Visit energystar.gov/rebate-finder or scan the QR code to learn if you qualify.

Public Service Company of Oklahoma Rebates for Hybrid Water Heaters

Some homeowners in Oklahoma may qualify for rebates on their water heaters. Visit psc.ok.gov/RebateEligibilityCheck or scan the QR code to learn if you qualify.

Zero Energy Ready Home™ Consumer Flyers

Energy.gov has consumer flyers that can be accessed at energy.gov/eere/buildings/sales-and-marketing-resources-zeroh-partners. Copies are included in this section of your resource guide.



Your Clayton eBuilt™ Home

Solar - ready

SmartComfort® by Carrier® HVAC heat pump

Rheem® hybrid heat pump water heater

Argon gas low-E windows

ecobee® smart thermostat

ENERGY STAR® Frigidaire® appliances

Pfister® bathroom fixtures

LED lighting

Insulated exterior doors

Additional home insulation

Sealed duct system

Whole house ventilation system



Homes so energy efficient,
you can save

40-50%

on annual utility costs¹

SAVE MONEY on Energy Bills

eBuilt™ homes consume less energy, which can reduce your annual utility expenses by 40-50%¹. That adds up to substantial savings for you each year!

Average monthly energy costs comparisons² between eBuilt™ homes and traditional manufactured homes across the country:

Sacramento, CA

eBuilt™

\$154.10

vs

**Traditional
manufactured home:**

\$257.93

Phoenix, AZ

eBuilt™

\$100.96

vs

**Traditional
manufactured home:**

\$137.75

Dallas, TX

eBuilt™

\$95.53

vs

**Traditional
manufactured home:**

\$149.11

Knoxville, TN

eBuilt™

\$103.27

vs

**Traditional
manufactured home:**

\$163.79

Albany, NY

eBuilt™

\$238.88

vs

**Traditional
manufactured home:**

\$369.85

eBuilt™ homes meet the US Department of Energy's ZERO ENERGY READY HOME national requirements.

Sources

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf

² Energy savings are based on electrical energy consumption using NREL® BEopt™ to estimate annual electrical energy consumption of a home built to DOE Zero Energy Ready Home™ guidelines compared to the same home built only to industry and HUD standards in the cities listed.

SCAN TO TAKE
an eBuilt™ home tour!





What is an eBuilt™ Home?

An eBuilt™ home is built to the US Department of Energy's ZERO ENERGY READY HOME™ manufactured home standards. High-performing and energy efficient, it is built to add a renewable solar energy system if you choose to do so after purchase.

How much can I save on my utility bill?

eBuilt™ homes are incredibly energy efficient, even meeting and exceeding ENERGY STAR® standards. Compared to traditional manufactured homes, eBuilt™ homes can reduce your annual utility bill on average by 40-50%.¹

If combined with a renewable energy source like solar panels, the home can offset up to 100% of its annual energy use, meaning it generates the power it consumes. This is referred to as a “net zero” home.

How do I add solar panels to my home?

The US Department of Energy provides a helpful homeowner's guide to going solar: www.energy.gov/eere/solar/homeowners-guide-going-solar.

What makes my home so energy efficient?

Your eBuilt™ home is built with energy-efficient features such as low-E windows, insulated doors, extra insulation, and ENERGY STAR® appliances, including a SmartComfort® by Carrier heat pump HVAC and a Rheem® hybrid heat pump water heater.

How do air source heat pumps work?

Traditional furnaces and hot water heaters require a constant heat source to create warm or cold air and hot water. Air source heat pumps, on the other hand, extract heat from the air and uses a compressor and refrigerant to generate heat. This conversion process is highly energy efficient, using half as much energy on average as other electric home-heating and cooling sources.³

How does a heat pump keep my home cool during summer?

Heat pumps provide both heating and cooling by moving heat into your home during cold weather, then reversing the process to move heat and humidity outside your home during warmer weather.

Do heat pumps work well in cold weather climates?

A heat pump will keep your home comfortably warm in the winter. Your SmartComfort® by Carrier heat pump serves as the primary source of heating for your home and uses a built-in supplemental heating source if needed. Your heat pump model was specifically chosen based on your climate conditions and home size, which allows the heat pump to work more efficiently.

Do I need to run a dehumidifier with a heat pump?

Heat pumps dehumidify the air as it cools your home, so they do not require a dehumidifier. In some climate areas,⁴ homes may include a designated dehumidifier area with a built-in drain for easy installation if you choose to add one.

Are heat pump water heaters noisy?

Your Rheem® hybrid heat pump water heater has a sound rating of 49 decibels, which is similar to a refrigerator.⁵

Sources

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf

² Energy savings are based on electrical energy consumption using NREL® BEopt™ to estimate annual electrical energy consumption of a home built to DOE Zero Energy Ready Home™ guidelines compared to the same home built only to industry and HUD standards in the cities listed.

³ <https://www.energy.gov/energysaver/heat-pump-systems>

⁴ <https://www.manufacturedhousing.org/thermal-map/>

⁵ <https://ehs.yale.edu/sites/default/files/files/decibel-level-chart.pdf>

ENERGY STAR is a registered trademark owned by the U.S. Environmental Protection Agency.





Your Clayton eBuilt™ Home

Solar - ready

SmartComfort® by Carrier® gas furnace

Rheem® hybrid heat pump water heater

Argon gas low-E windows

ecobee® smart thermostat

ENERGY STAR® Frigidaire® appliances

Pfister® bathroom fixtures

LED lighting

Insulated exterior doors

Additional home insulation

Sealed duct system

Whole house ventilation system



Homes so energy efficient,
you can save

40-50%

on annual utility costs¹

SAVE MONEY on Energy Bills

eBuilt™ homes consume less energy, which can reduce your annual utility expenses by 40-50%¹. That adds up to substantial savings for you each year!

Average monthly energy costs comparisons² between eBuilt™ homes and traditional manufactured homes across the country:

Sacramento, CA

eBuilt™

\$150.25

VS

Traditional
manufactured home:

\$199.33

Phoenix, AZ

eBuilt™

\$114.52

VS

Traditional
manufactured home:

\$141.58

Dallas, TX

eBuilt™

\$105.50

VS

Traditional
manufactured home:

\$130.08

Knoxville, TN

eBuilt™

\$96.58

VS

Traditional
manufactured home:

\$120.58

Albany, NY

eBuilt™

\$155.71

VS

Traditional
manufactured home:

\$208.08

eBuilt™ homes meet the US Department of Energy's ZERO ENERGY READY HOME national requirements.

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Traditional hot water heaters require a constant heat source to create warm or cold air and hot water. Air source heat pumps, on the other hand, extract heat from the air and uses a compressor and refrigerant to generate heat. This conversion process is highly energy efficient, using half as much energy on average as other electric heating sources.³

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eBuilt™ Home Features

Homes so **energy efficient**, you can save

40-50% on annual utility costs¹



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an eBuilt™ home tour!



**Whole House
Ventilation System**



**Rheem® Hybrid Heat
Pump Water Heater**



**Lux® Argon Gas
Low-E Windows**



**Insulated
Exterior Doors**



**Additional
Insulation**



**ecobee®
Smart Thermostat**



**ENERGY STAR®
Frigidaire® Appliances**



**SmartComfort® by Carrier®
HVAC Heat Pump
or Gas Furnace**



**LED
Lighting**



Solar - Ready

eBuilt™

clayton Built

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf
² Based on comparison of the annual operating cost of a 40- and 50-gallon Rheem® Pro Terra Hybrid model which assumes the unit is on constantly throughout the year against the energy needed to power a single 100-Watt incandescent light bulb constantly for one year.
³ <http://energy.gov/energysaver>
⁴ Control from anywhere features requires Internet and smart phone that are not included.
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Ready to Go Solar?

Energy-efficient eBuilt™ homes can save you up to 40-50% on your power bill annually,¹ and even more if you add a renewable solar energy system after purchasing your home.

Adding solar panels converts your home into a “net zero” home, which means your home can theoretically generate as much energy as it consumes.

Ready to take the next step with going solar? Here are some solar resources and information for your eBuilt™ home:

US Department of Energy Homeowner's Guide to Going Solar

Energy.gov has created a thorough online homeowner's guide to going solar. Topics include information about how solar works, how to start the process of adding solar to your home, solar storage, and links to other comprehensive solar information sources. The site also provides information about tax incentives for solar investments.

SCAN TO ACCESS

Energy.gov's Homeowner's Guide to Going Solar



Solar Installation Recommendations

For eBuilt™ homes, we recommend a ground installation for solar panels for several reasons:



Ground installation allows you to place the panels for optimal energy generation without impacting the direction your home faces.



Improper roof installation from a third-party solar vendor could potentially damage your roof, which would not be covered by your home warranty.

The US Department of Energy recommends you partner with a reputable solar vendor certified by the North American Board of Certified Energy Practitioners (NABCEP).

eBuilt™

¹ https://www.energy.gov/sites/default/files/2022-11/ZERH%20Name%20and%20Logo%20Use%20Guidelines_0.pdf

eBuilt™ Homeowner Video Library

Our eBuilt™ homeowner library has helpful videos to demonstrate various maintenance items to ensure your home's optimal performance for years to come. We encourage you to watch these videos, as your home's unique construction and high-efficiency appliances require some maintenance and care items that may be new to you as a homeowner.



eBuilt™ home tour video

Learn about the energy-efficient features of your new eBuilt™ home.



eBuilt™ home maintenance video (full length)

This comprehensive video walks you through various routine maintenance recommendations to ensure optimal home performance.



Rheem® hybrid heat pump water heater

Your water heater has a filter that should be cleaned every 30 days for optimal performance. This short video walks you through the cleaning process.



SmartComfort® by Carrier® heat pump or gas furnace

The filter in your HVAC heat pump or gas furnace should be changed every 30 days for optimal performance. This quick video shows where the filter is located and how to replace it.



Whole home ventilation system

It is recommended you run the exhaust fan for the first several months of homeownership. This video explains more about your home's ventilation system.



ecobee® smart thermostat

For homes with electric heat pumps, we've included step-by-step instructions on how to switch your ecobee smart thermostat to auxiliary heat mode if needed in colder weather.



Dehumidifier installation

eBuilt™ homes in some climate zones are designed to accommodate a dehumidifier in the utility room. This video provides step-by-step instructions on how to install a dehumidifier if you choose to add one.

eBuilt™

Clayton Built

eBuilt™ Homeowner Rebates

ENERGY STAR®

As an eBuilt™ homeowner, you may be eligible for rebates on ENERGY STAR® certified products. To find out if you qualify, visit energystar.gov/rebate-finder or scan the QR code and follow these instructions:



- ✓ Enter your zip code in the search bar at the top of the page and click on the search button.
- ✓ Scroll down to see a list of available rebates in your area. You will need to scroll past rebates labeled “Federal,” as these do not apply to new home purchases like your eBuilt™ home.
- ✓ Look for “Incentives offered by (your utility provider or local municipality)”.
- ✓ Follow the link provided in the search result to learn more about that local rebate and application process. This process, if available, will require the following:
 - Utility account information (account number and home address)
 - Manufacturer and model number of the item for which you’re seeking a rebate.

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ecobee® Smart Thermostat Rebate

Every eBuilt™ home includes an ecobee® smart thermostat, and homeowners in some areas may qualify for rebates and incentives. Visit ecobee.com/en-us/rebates or scan this QR code and enter your zip code to find out if you are eligible.



Entergy Mississippi Rebates for Hybrid Water Heaters

Some homeowners in Mississippi may qualify for rebates on hybrid water heaters. Visit entergy-mississippi.com/your_home/save_money/ee/water-heaters or scan this QR code to learn if you qualify.



Public Service Company of Oklahoma Rebates for Hybrid Water Heaters

Some homeowners in Oklahoma may qualify for rebates on hybrid water heaters. Visit pso-esp.com/Rebate/Eligibility/Check or scan this QR code to see if you qualify.



The Future of Housing—Today

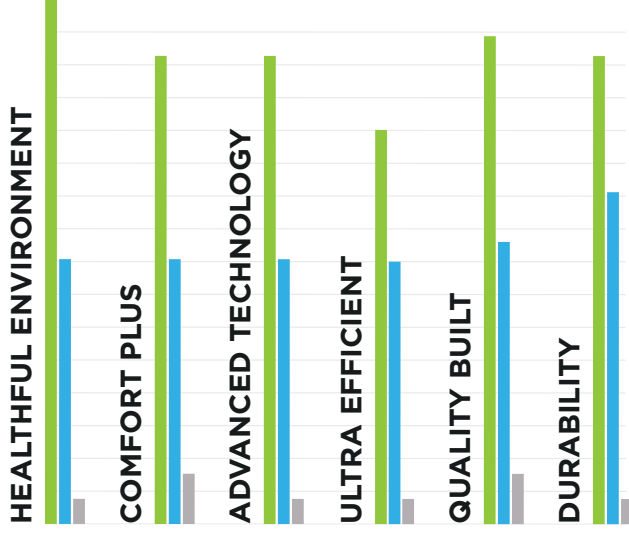
Only a select group of the top builders in the country meet the extraordinary levels of excellence and quality specified by U.S. Department of Energy guidelines.



LEARN MORE AT:
buildings.energy.gov/zero



A Symbol of Excellence



KEY ■ DOE Zero Energy Ready Home
■ ENERGY STAR Certified Home
■ Existing Home

This label indicates relative performance of this DOE Zero Energy Ready Home to existing homes (built between 1990 and 2010) and ENERGY STAR Certified Homes. Actual performance may vary.



A Symbol of Excellence

Every Zero Energy Ready Home offers a cost-effective, high performance package of energy savings, comfort, health, and durability unparalleled in today's marketplace.





Lives better.

HEALTHFUL ENVIRONMENT

Every DOE Zero Energy Ready Home has a comprehensive package of measures to minimize dangerous pollutants, provide continuous fresh air, and effectively filter the air you breathe.

COMFORT PLUS

Superior insulation, windows, air sealing and space conditioning systems included in every DOE Zero Energy Ready Home surround you with even temperatures, low-humidity, and quiet in every room on every floor.

KEY ■ DOE Zero Energy Ready Home

■ ENERGY STAR Certified Home

■ Existing Home



Works better.

ADVANCED TECHNOLOGY

Every DOE Zero Energy Ready Home begins with solid building science specified by ENERGY STAR for Homes, and then adds advanced technologies and practices from DOE's world-class research program, Building America.

ULTRA EFFICIENT

Compared to a typical home, an ultra efficient Zero Energy Ready Home is inexpensive to own. In fact, every DOE Zero Energy Ready Home is so energy efficient, a small solar electric system can easily offset most, or all, of your annual energy consumption. We call this Zero Net-Energy Ready.



Lasts better.

QUALITY BUILT

Advanced construction practices and technologies are specified for every DOE Zero Energy Ready Home. Then they are enforced by independent verifiers with detailed checklists and prescribed diagnostics.

DURABILITY

The advanced levels of energy savings, comfort, health, durability, quality and future performance in every DOE Zero Energy Ready Home provide value that will stand the test of time, and will meet and exceed forthcoming code requirements.

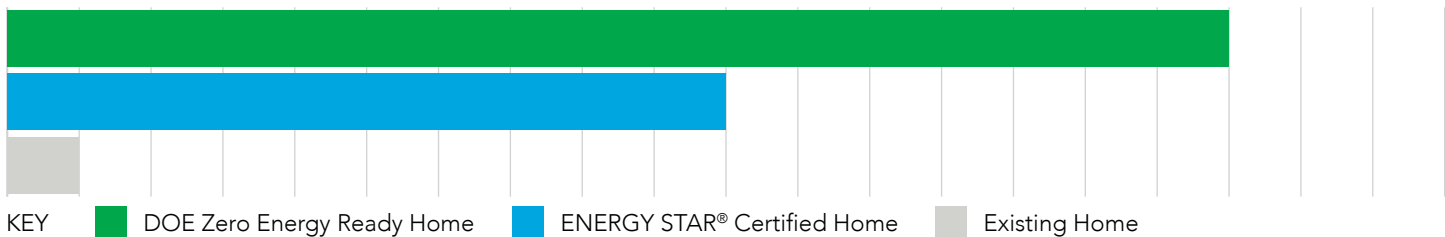
LEARN MORE AT: buildings.energy.gov/zero



Take Advantage of Innovative Technology

The largest investment of a lifetime should stand the test of time. Put aside fears of obsolescence with Zero Energy Ready Home. That's because advanced technology innovations and building systems meet and exceed forthcoming energy codes. As a result, you're investing in a home of the future and not the past.

Compare the Difference



"We were attracted to...a complete high-performance package, high energy efficiency, high water efficiency, and air filtration for indoor air quality."

— Homeowner

"We didn't want to think back in 10, 20, or 30 years and be kicking ourselves for not taking advantage of the technological advances in home building."

— Homeowner

"The Zero Energy Ready Home takes advantage of new technologies and materials...to have a more efficiently operating home with less maintenance."

— Homeowner



Zero Energy Ready Home Technology Package

Advanced Enclosure

Extra insulation expertly installed ensures an effective thermal blanket around your home. High-performance windows with advanced technology coatings block out unwanted summer heat gain and minimize winter heat loss. Lastly, comprehensive air sealing technology helps eliminate drafts that can compromise comfort and durability

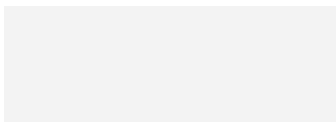
Advanced Equipment

High-efficiency heating and cooling equipment are commonly used that feature the latest technology for performance and efficiency. In addition, the full comfort system is installed to industry best practices including ducts located for optimized performance. Latest technology high-efficiency water heaters are also included in many homes.

Advanced Components

Key components are ENERGY STAR® certified including appliances (e.g., refrigerators, dishwashers), fans (e.g., bath exhaust and ceiling fans), and LED Lighting. In addition, efficient plumbing solutions help save thousands of gallons of water going down the drain. Where a solar system is not included and significant annual sunlight is accessible, critical details ensure one can be added in the future with no disruption or cost penalty.

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ENERGY

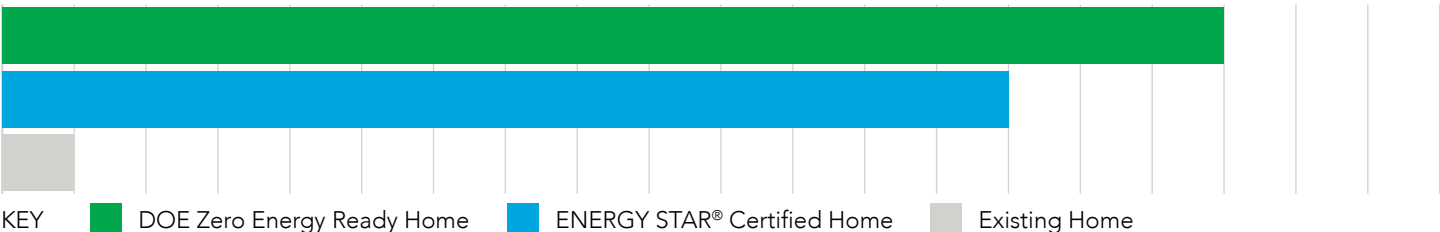
LEARN MORE AT: buildings.energy.gov/zero



Live in Tomorrow's Home, Today

Every Zero Energy Ready Home meets the federal government's most rigorous guidelines for high-performance. As a result, you can look forward to a wide array of durability benefits such as low maintenance, no window condensation, no ice damming, ease of cleaning, and just a better protected home.

Compare the Difference



"I love this home. I never thought home ownership could be this easy. No condensation on windows, less dust, very little maintenance, affordable utilities, and it's good for the environment. It has improved our quality of life."

— Homeowner

"We have lived in the home for two years now and couldn't be happier with the quality of construction, and the ease of living in, cleaning and maintaining the home."

— Homeowner

"The Zero Energy Ready Home takes advantage of new technologies and materials...to have a more efficiently operating home with less maintenance."

— Homeowner



Zero Energy Ready Home Durability Package

Dry-by-Design Construction

Comprehensive water protection details are included from roof to foundation to safeguard your home from moisture damage and mold problems. You may not think about this protection when buying a home, but you will sleep better every night knowing it's there.

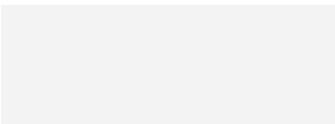
Advanced Moisture Control

High-efficiency, heating and cooling systems are designed and properly installed along with proper pressure balancing to control humidity and minimize moisture problems. In addition, whole-house fresh air systems and exhaust fans work in tandem with the comfort system work to dilute moisture generated indoors.

Higher-Grade Components

Energy efficient components provided commonly feature higher quality construction and last longer. This includes ENERGY STAR® appliances (e.g., refrigerators, dishwashers), ENERGY STAR fans (e.g., bath exhaust and ceiling fans), and ENERGY STAR LED Lighting.

Brought to you by:



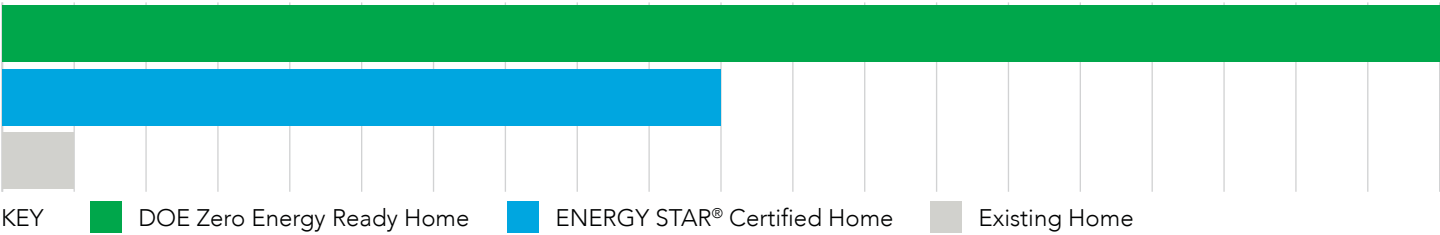
LEARN MORE AT: buildings.energy.gov/zero



Live Better with a Healthier Home

The average person spends over 60% of their time inside their home each day. That's why every Zero Energy Ready Home meets the federal government's most rigorous guidelines for indoor air quality. You can look forward to a wide array of health benefits such as less allergies, odors, mold, reliance on inhalers, and doctor visits. You deserve to breathe better!

Compare the Difference



"We have always suffered from allergies... I can come back home and my odorless, fresh space speaks for itself. No mold, no breathing problems, no fumes and no itchy eyes. We are definitely happy."

— Homeowner



"Our lives are healthier because of the great effort from the builders to eliminate or minimize harmful materials during construction."

— Homeowner

Zero Energy Ready Home Health Package

Contaminant Source Control

Air sealing and screening block outdoor dust, pollen, and pests from getting in. Materials are specified with no or low chemical content. Water protection from roof to foundation minimizes moisture related problems. Furnaces and water heaters cannot back-draft exhaust fumes. Radon resistant construction provided in high risk zones vents dangerous soil gases. It's like an organic home that keeps the bad stuff out.

Fresh Air System

Since homes are built much more air-tight today, a fresh air system is provided to eliminate residual contaminants and moisture by replacing all the air in your home over three times each day. In addition, kitchen and bathrooms exhaust fans remove moisture, odors, and contaminants from cooking and bathing. A home just lives better with fresh air.

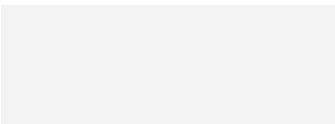
High-Capture Filtration

All homes with ducted heating and cooling also include advanced technology filtration that exceeds minimum industry standards for removing air-borne particles associated with common respiratory problems. If you notice a lot less dust and breathe better, this can be a big reason why.

"It is great peace of mind to know that the air quality is good and I don't have to worry about my children's health."

— Homeowner

Brought to you by:



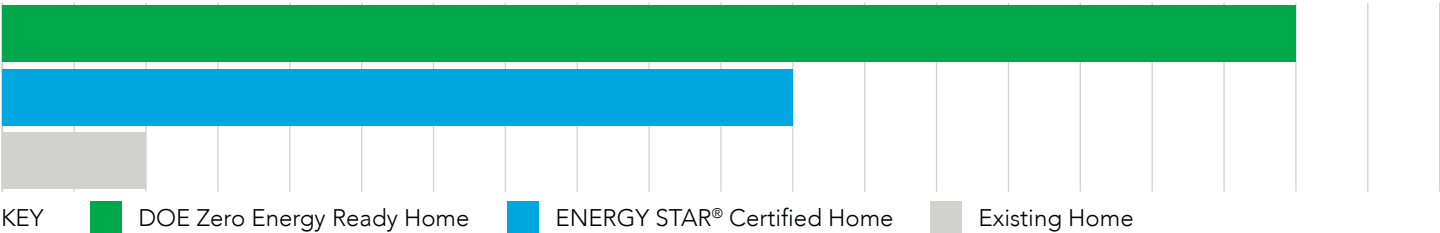
LEARN MORE AT: buildings.energy.gov/zero



Live More, Worry Less

Homebuyers are typically untrained to discern complex details, technologies, and practices not visible in a finished home. With a Zero Energy Ready Home, you can enjoy peace-of-mind knowing your home is held to a higher standard beyond minimum code. This means you can look forward to living with ease of maintenance, minimal heating and cooling bills, enhanced comfort, and the great feeling waking up each day in a quality built home.

Compare the Difference



"We have lived in the home for two years now and couldn't be happier with the quality of construction, and the ease of living in, cleaning and maintaining the home."

— Homeowner

"We looked for a long time and were finding the choice between bad and worse. This house is so preferable, to be in a home that is so well built. It's double checked. We like the fact that standards are in place."

— Homeowner

"There is not a single thing we dislike about this home and we love the quality of construction."

— Homeowner



Zero Energy Ready Home Quality Built Package

Quality Construction

All Zero Energy Ready Homes are constructed to meet the federal government's most rigorous guidelines for high-performance homes. This includes industry leading best practices for wall, roof, and foundation assemblies along with windows that meet or exceed ENERGY STAR® certification.

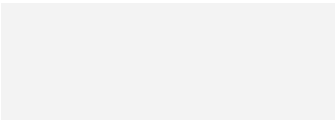
Quality Components

All lighting, appliances, and fans provided are ENERGY STAR® certified for both high-efficiency and performance that meets or exceeds consumer quality expectations. In addition, high-efficient heating, cooling, and hot water equipment commonly provided include higher grade components and are quality installed to industry best practices.

Certified Performance

Each home includes three certifications: ENERGY STAR® for above code energy efficiency; EPA Indoor airPLUS for comprehensive indoor air quality measures; and Zero Energy Ready Home for optimized efficiency plus performance. This independent verification requires performance simulations, field inspections, diagnostic testing, and detailed checklists. As a result, each home is held to a substantially higher standard than a typical new home.

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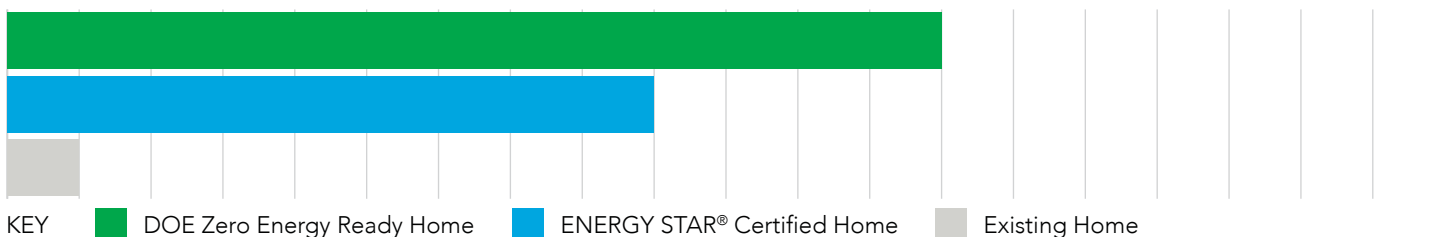
LEARN MORE AT: buildings.energy.gov/zero



Take Control of Your Utility Bills

Each Zero Energy Ready Home optimizes energy efficiency. As a result, monthly utility bill savings can easily exceed the incremental increase in the monthly mortgage. As a result, you can look forward to lower ownership cost the day you move in with utility savings adding up to \$10,000s and often over \$100,000 over a 30-year mortgage. What a great investment!

Compare the Difference



"Our energy bills are less than half of our previous home with 20% more square footage."

— Homeowner

"We love our electric bill, or maybe we should say lack of bill. We have a home that not many people get to have. Most people don't understand how much this home helps our family save money, live healthier, and be protected."

— Homeowner

"Our energy bills are lower than ever but our quality of life is higher."

— Homeowner



Zero Energy Ready Home Energy Efficiency Package

Efficient Enclosure

Extra insulation meets or exceeds forthcoming energy codes and is quality-installed to ensure an effective thermal blanket around each home. High-performance windows use advanced coatings to block unwanted summer heat gain and minimize winter heat loss. Comprehensive air sealing is applied to over a half-mile of cracks and seams in a typical home along with holes and penetrations to help eliminate drafts.

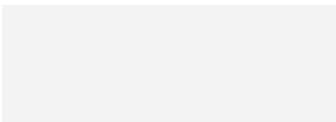
Efficient Comfort System

Heating and cooling systems commonly utilize the latest high-efficiency equipment and are quality installed to industry best practices including duct locations optimized for performance. This will ensure energy efficient operation along with even distribution of comfort and humidity control throughout the home.

Efficient Components

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