

eBuilt™

Resource Guide





Dear Valued Business Partner,

We're so excited to share with you our new housing initiative, eBuilt™ homes, and how your partnership plays a vital role in helping make home ownership more attainable for families across the country.

Home energy expenses continue to rise, and in 2021, homeowners paid nearly 15% more for electricity than the year before - that's double the rate of inflation. These are real dollars from our customers' wallets, and this extra financial burden is what inspired us to launch eBuilt™ homes.

eBuilt™ homes are the highest-performing, most energy-efficient homes we've ever built. Constructed 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 They're also built to add a ground-based renewable solar energy system for even more savings if the homeowner chooses to add one after purchase.

The HVAC set up and installation requirements are critical to the home's energy efficiency, and ***your partnership in this step is vital.*** To assist you, we've created resources with answers to frequently asked questions and information about eBuilt™ technical specifications. For your awareness, we've also included the new eBuilt™ home standards – 25 enhancements that are built into the home's construction and ***provided to the homeowner at no additional cost.***

Building energy-efficient homes is the right thing to do for our customers, and we're excited to take this next step with you in making the dream of home ownership more attainable than ever with 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

SCAN TO TAKE
an eBuilt™ home tour!



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



Your Clayton eBuilt™ Home

Solar - ready

SmartComfort® by Carrier® HVAC heat pump
(if electric 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™

\$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 HVAC heat pump with electric furnace or high efficiency gas furnace, Rheem® hybrid water heater, and a Frigidaire® refrigerator and dishwasher.

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 while supplying cool air to the interior of the home.

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 the electric furnace as 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.



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
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Kick out flashing	Kick out flashing	Kick out flashing
Dehumidifier drain installed	Dehumidifier drain installed	Dehumidifier drain installed
		2" x 6" sidewalls (optional)

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

☐ Outdoor packaged HVAC units

Outdoor package units are allowed but such systems must:

a. be a heat pump for homes powered by electric;

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.

eBuilt™ HVAC Heat Pump FAQs

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. Heat pumps cool as effectively as traditional air conditioners. The advantage to a heat pump is that while it cools, it also regulates the humidity in a home, making the home more comfortable.

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 the electric furnace as back-up 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 the installer 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.



eBuilt Heat Pump Models

Clayton Home Building Group® partners with SmartComfort® by Carrier®, a trusted Clayton Built® partner, for electric heat pumps and gas furnaces.

If you choose to use a different brand, please be aware their heat pump specifications must match the corresponding Carrier® heat pump model.

SmartComfort® by Carrier® heat pump models used in eBuilt™ homes include:

- ✓ R4H5S18*K*AAA*
- ✓ R4H5S24*K*NAA*
- ✓ R4H5S30*K*AAA*
- ✓ R4H5S36*K*AAA*
- ✓ R4H5S42*K*AAA*
- ✓ R4H5S48*K*NAA*
- ✓ R4H5S54*K*NAA*
- ✓ R4H5S60*K*AAA*



eBuilt™ Guidelines for Manual S Equipment Sizing

1. Create a Manual J load calculation using Wrightsoft.
2. Verify SmartComfort® by Carrier® furnace can provide required CFMs based on Wrightsoft design at 0.3 – 0.6 in wc.
3. Ensure cooling equipment latent load capacity meets or exceeds the latent load required.
4. Choose the smallest AC or heat pump unit to provide total cooling capacity or sensible cooling capacity up to 115% of the cooling load.
5. Choose the smallest electric furnace to provide heating capacity up to 175% of the heating load. *Assumes the outside unit is a heat pump.
6. Choose the smallest gas furnace to provide heating capacity up to 140% of the heating load. *Adjust capacity for altitude.
7. Make every effort to comply with these Manual S design steps. If HVAC equipment is not available that meets all of these requirements, then select equipment that best meets these guidelines in this priority order.

EXCEPTIONS

Furnace size may be increased to provide CFMs required when comparing static pressure to SmartComfort® by Carrier® performance charts.

A 10kW electric furnace and 40k gas furnace may be installed regardless of the Manual J heating load and over-sizing percentage. These are the smallest furnace sizes available.

A 2-ton AC or heat pump may be installed regardless of the Manual J cooling load and over-sizing percentages. This is the smallest size available.

NOTES

The Wrightsoft design page (Loads: Project Summary) must be provided to the Retailer or HVAC Field Tech.

If a customer has a concern about sizing, the Clayton HBG Field Installation Checklist must be completed prior to Engineering evaluation. Please submit completed checklist to the home building facility's Customer Care team.



Clayton HBG HVAC Field Installation Checklist

Are all penetrations in the bottom board sealed/repaired? ☐ Yes ☐ No

Has the downflow crossover duct been verified to have been installed directly beneath the furnace? ☐ Yes ☐ No

What is the furnace blower speed setting? _____

Return side static _____"wc

Supply side static _____"wc

Total static _____"wc

What is the outdoor dry bulb temperature? _____

What is the indoor wet bulb temperature? _____

What is the return air dry bulb temperature? _____

What is the supply air dry bulb temperature? _____

Return air minus supply air should be ≥ 16 degrees

Suction Line Pressure

What is the suction line temperature near condensing unit charging port? _____

What is the vapor saturation temperature? _____

What is the superheat? _____

Liquid Line Pressure

What is the liquid line temperature near condensing unit charging port? _____

What is the Liquid Saturation temperature? _____

Subcooling? _____

REMEMBER:

- Low superheat is OVERCHARGED
- High superheat is UNDERCHARGED
- Low subcooling is UNDERCHARGED
- High subcooling is OVERCHARGED
- Conflicting data between the superheat and subcooling suggest the TXV is malfunctioning or the system is restricted.
- Please submit completed checklist to the home building facility's Customer Care team.



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