ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1F 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-105A, FC-105B and FC-105C Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*					
2.1 Heat Loss / Gain Method:	☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:			☑	☐	-
2.2 Duct Design Method:	☐ Manual D	☑ Other: Engineer		☑	☐	☐
2.3 Equipment Selection Method:	☐ Manual S ☐ OEM Rec.	☑ Other: Engineer		☑	☐	-
2.4 Outdoor Design Temperatures: [9]	Location: Boise	1%: 95 °F	99%: 10.! °F	☑	☐	-
2.5 Orientation of Rated Home (e.g., North, South):	North			☑	☐	-
2.6 Number of Occupants Served by System: [10]	3			☑	☐	-
2.7 Conditioned Floor Area in Rated Home:	696	Sq. Ft.		☑	☐	-
2.8 Window Area in Rated Home:	93	Sq. Ft.		☑	☐	-
2.9 Predominant Window SHGC in Rated Home: [11]	0.46			☑	☐	-
2.10 Infiltration Rate in Rated Home: [12]	Summer: average	Winter: average		☑	☐	-
2.11 Mechanical Ventilation Rate in Rated Home:	45	CFM		☑	☐	-
2.12 Design Latent Heat Gain:	561	BTUh		☑	☐	-
2.13 Design Sensible Heat Gain:	13,608	BTUh		☑	☐	-
2.14 Design Total Heat Gain:	14,169	BTUh		☑	☐	-
2.15 Design Total Heat Loss:	11,009	BTUh		☑	☐	-
2.16 Design Airflow: [13]	Equipment supply	CFM		☑	☐	-
2.17 Design Duct Static Pressure: [14]		In. Water Column		☐	☐	☑
2.18 Full Load Calculations Report Attached [15]				☑	☐	-

3. Selected Cooling Equipment, If Cooling Equipment to be Installed					
3.1 Condenser Manufacturer & Model:	Samsung model JXH36			☑	☐	☐
3.2 Evaporator / Fan Coil Manufacturer & Model:	Samsung model RNS07 and RNS0!			☑	☐	☐
3.3 AHRI Reference #: [16]	205291855			☑	☐	☐
3.4 Listed Efficiency:	10.9 EER	18.0 SEER		☑	☐	☐
3.5 Metering Device Type:	☐ TXV	☐ Fixed orifice	☑ Other:	☑	☐	☐
3.6 Refrigerant Type:	☑ R-410a	☐ Other:		☑	☐	☐
3.7 Fan Speed Type: [17]	☐ Fixed	☑ Variable (ECM / ICM)	☐ Other:	☑	☐	☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18]		BTUh		☐	☐	☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18]		BTUh		☐	☐	☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18]	36,000	BTUh		☑	☐	☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed				☐	☐	☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]				☑	☐	☐
3.13 AHRI Certificate Attached [16]				☐	☐	☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed						
4.1 AHRI Listed Efficiency:	9.5	HSPF or Ground-Source:	COP	☑	☐	☐
4.2 Performance at 17°F:	Capacity 36,000 BTUh	Efficiency:	COP [20]	☑	☐	☐
4.3 Performance at 47°F:	Capacity 36,000 BTUh	Efficiency:	COP [20]	☑	☐	☐

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5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8.21]	☐	☐	☑
6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser: ____ °F DB	☐	☐	☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode: ____ °F WB	☐	☐	☑
6.3 Liquid line pressure: ____ psig	☐	☐	☑
6.4 Liquid line temperature: ____ °F DB	☐	☐	☑
6.5 Suction line pressure: ____ psig	☐	☐	☑
6.6 Suction line temperature: ____ °F DB	☐	☐	☑
7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____ °F DB (Using Value 6.3)	☐	☐	☑
7.2 Subcooling value: _____ °F DB (Value 7.1 - Value 6.4)	☐	☐	☑
7.3 OEM subcooling goal: _____ °F DB	☐	☐	☑
7.4 Subcooling deviation: _____ °F DB (Value 7.2 – Value 7.3)	☐	☐	☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____ °F DB (Using Value 6.5)	☐	☐	☑
7.6 Superheat value: _____ °F DB (Value 6.6 – Value 7.5)	☐	☐	☑
7.7 OEM superheat goal: _____ °F DB (Using superheat tables and Values 6.1 & 6.2)	☐	☐	☑
7.8 Superheat deviation: _____ °F DB (Value 7.6 – Value 7.7)	☐	☐	☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F	☐	☐	☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or super-heat process and documentation has been attached that defines this procedure	☐	☐	☑
8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan: ____ amperage _____ line voltage	☐	☐	☑
8.2 Condenser unit: ____ amperage _____ line voltage	☐	☐	☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value	☐	☐	☑
9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM	☐	☐	☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling	☐	☐	☑
9.3 Return duct static pressure: _____ IWC Test Hole Location: [23] _____	☐	☐	☑
9.4 Supply duct static pressure: _____ IWC Test Hole Location: [23] _____	☐	☐	☑
9.5 Test hole locations are well-marked and accessible [23]	☐	☐	☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM	☐	☐	☑
10. Air Balance			
10.1 Balancing report prepared and attached indicating the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and documented through one of the following options:			
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, documented by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;	☐	☐	☑
10.1.2 To be measured, documented, and verified by a Rater per Item 1.4.2 of the HVAC System QI Rater Checklist	☐	☐	☑
11. System Controls			
11.1 Operating and safety controls meet OEM requirements	☐	☐	☑
12. Drain pan			
12.1 Corrosion-resistant drain pan, properly sloped to drainage system, included with each HVAC component that produces condensate [25]	☐	☐	☑

HVAC Company Name: Advanced Heating And Cooling Credentialing Organization: ACCA / AE / Other

HVAC Contractor Name: Caleb Knutson HVAC Contractor Signature: _____ Date: 5/8/23

Builder Name: [5] Visser Building Builder Signature: [5] David Fielding Date: 5/22/23

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HVAC System Quality Installation Contractor Checklist [1]

Notes:

1. This Checklist is designed to align with the requirements of ASHRAE 62.2-2010 and published addenda and ANSI / ACCA's 5 QI-2007 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.

   This Checklist applies to ventilation systems; to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65,000 Btu / h with forced-air distribution systems (i.e., ducts) and to furnaces up to 225,000 Btu / h with forced-air distribution systems (i.e., ducts). **All other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems are exempt. If the ventilation system is the only applicable system installed in the home, then only Section 1 shall be completed.**

   One Checklist shall be completed for each system and provided to the Rater.

2. Description of HVAC system location or area served (e.g., "whole house", "upper level", "lower level").
3. Check "Yes" if this system is to handle temporary occupant loads. Such a system may be required to accommodate a significant number of guests on a regular or sporadic basis and shall be handled by a supplemental cooling system (e.g., a small, single-package unit or split-coil unit) or by a system that can shift capacity from zone to zone (e.g., a variable volume system).
4. The person responsible for the heating, cooling, & ventilation design shall be responsible for completing Sections 1 and 2 of this Checklist.
5. For Sections 1 through 5, the 'Builder Verified' column shall be used to indicate items verified by the builder (or a firm or HERS Rater hired by the builder). If any Items have been marked 'Builder Verified', then the builder is responsible for these Items and must sign this Checklist. Note that builders are not permitted to verify any Items in Sections 6-12.
6. For Sections 1 through 5, the 'Cont. Verified' column shall be used to indicate Items verified by the credentialed contractor (or a firm or HERS Rater hired by the contractor). In contrast, for Sections 6 through 12, the 'Cont. Verified' column shall *only* be used to indicate Items verified by the credentialed contractor (i.e., neither a builder, nor a firm, nor a HERS Rater are permitted to verify Sections 6 - 12). The credentialed contractor is responsible for these Items and shall sign this Checklist.
7. For proper procedures, exceptions, and selection methods see ASHRAE 62.2-2010 and published addenda. All components shall be designed and installed per local codes, manufacturers' installation instructions, engineering documents, and regional ENERGY STAR program requirements.

   The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of an exhaust ventilation system. Outdoor air ducts connected to the return side of an air handler are allowed to be part of a supply ventilation system if manufacturer requirements for return air temperature are met.
8. Heating and cooling loads shall be calculated, equipment shall be selected, and duct systems shall be sized according to the latest editions of ACCA Manuals J, S, & D, respectively, 2009 ASHRAE Handbook of Fundamentals, or other methodology approved by the Authority Having Jurisdiction. The HVAC system design shall be completed for the specific configuration (e.g., plan, elevation, option, and orientation) of the home to be built except as permitted herein.

   For each house plan with multiple configurations (e.g., orientations, elevations, options), the loads shall be calculated for each potential configuration. If the loads across all configurations vary by ≤ 25%, then the largest load shall be permitted to be used for equipment selection for all configurations, subject to the over-sizing limits of ACCA Manual S. Otherwise, the contractor shall group the load for each configuration into a set with ≤ 25% variation and equipment selection shall be completed for each set of loads.

   For each house plan with multiple configurations, the room-level design airflows shall be calculated for each potential configuration. If the design airflows for each room vary across all configurations by ≤ 25% or 25 CFM, then the average room-level design airflow shall be permitted to be used when designing the duct system. Otherwise, the contractor shall group the room-level design airflow for each configuration into a set with ≤ 25% or 25 CFM variation and the duct design shall be completed for the average airflow of that set.
9. If the design conditions are dictated by a code or regulation, then the requirements of the lawful or controlling authority supersedes the Manual J or ASHRAE default design values. Otherwise, the default values shall be used. The values for the geographically closest location shall be selected or a justification provided for the selected location.
10. The number of occupants among all HVAC systems in the home must be equal to the number of bedrooms, as defined below, plus one. Occupants listed for systems that are indicated in the header as a cooling system for temporary occupant loads, as described in Footnote 3, shall be permitted to exceed this limit.

    A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

    An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

    - have a sill height of not more than 44 inches above the floor; AND
    - have a minimum net clear opening of 5.7 sq. ft.; AND
    - have a minimum net clear opening height of 24 in.; AND
    - have a minimum net clear opening width of 20 in.; AND
    - be operational from the inside of the room without the use of keys, tools or special knowledge.
11. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
12. Infiltration rate shall reflect value used in confirmed or projected HERS rating for rated home. Alternatively, use "Average" or "Semi-loose" values for the cooling season infiltration rates and "Semi-tight" or "Average" values for the heating season infiltration rates, as defined by ACCA Manual J, Eighth Edition, Version Two.

13. Design airflow is the design value(s) for the blower in CFM, as determined by using the manufacturer's expanded performance data to select equipment, per ACCA Manual S procedures.
14. Design duct static pressure shall account for the installation of a MERV 6 or higher filter.
15. The load calculation for the home shall be provided, documenting all design elements and all resulting loads, including but not limited to the values listed in Items 2.1 through 2.17.
16. All evaporators and condensing units shall be properly matched as demonstrated by an attached AHRI certificate. If an AHRI certificate is not available, a copy of OEM-provided catalog data indicating acceptable combination selection and performance data shall be attached.
17. If the whole-house ventilation system utilizes the HVAC air handler, then the fan speed type shall be ECM / ICM and variable speed, or include a controller (e.g., smart cycler) that reduces the ventilation run time by accounting for hours when HVAC system is heating or cooling the home.
18. Listed system capacity at design conditions is to be obtained from the OEM expanded performance data.
19. For cooling systems, the next largest nominal piece of equipment may be used that is available to satisfy the latent and sensible requirements. Single-speed systems generally have OEM nominal size increments of ½ ton. Multi-speed or multi-stage equipment may have OEM nominal size increments of one ton. Therefore, the use of these advanced system types can provide extra flexibility to meet the equipment sizing requirements.
20. Items 4.2 and 4.3 are not applicable to ground-source heat pumps.
21. For warm air heating systems, the output capacity must be between 100% and 140% of calculated system load unless a larger size is dictated by the cooling equipment selection.
22. Either factory-installed or field-installed TXV's may be used. For field-installed TXV's, ensure that sensing bulbs are insulated and tightly clamped to the vapor line with good linear thermal contact at the recommended orientation, usually 4 or 8 o'clock.
23. Examples of return or supply duct static pressure measurement locations are: plenum, cabinet, trunk duct, as well as front, back, left or right side. Test hole locations shall be well marked and accessible.
24. Ducts shall not include coiled or looped ductwork except to the extent needed for acoustical control. Balancing dampers or proper duct sizing shall be used instead of loops to limit flow to diffusers. When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers located in the duct boot are permitted.
25. Condensate pan shall be made of corrosion-resistant materials, to include galvanized steel and plastic. Drain pan shall drain condensate to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drainage system; and shall be equipped with a backflow prevention valve when drained to a shared drainage system, such as a storm water management system.

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HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1E 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-102A and FC-102B Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*				
2.1 Heat Loss / Gain Method:	☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:		☑	☐ -
2.2 Duct Design Method:	☐ Manual D ☑ Other: Engineer		☑	☐ ☐
2.3 Equipment Selection Method:	☐ Manual S ☐ OEM Rec. ☑ Other: Engineer		☑	☐ -
2.4 Outdoor Design Temperatures: [9]	Location: Boise 1%: 95 °F 99%: 10.! °F		☑	☐ -
2.5 Orientation of Rated Home (e.g., North, South):	North		☑	☐ -
2.6 Number of Occupants Served by System: [10]	2		☑	☐ -
2.7 Conditioned Floor Area in Rated Home:	607	Sq. Ft.	☑	☐ -
2.8 Window Area in Rated Home:	93	Sq. Ft.	☑	☐ -
2.9 Predominant Window SHGC in Rated Home: [11]	0.46		☑	☐ -
2.10 Infiltration Rate in Rated Home: [12]	Summer: average Winter: average		☑	☐ -
2.11 Mechanical Ventilation Rate in Rated Home:	40	CFM	☑	☐ -
2.12 Design Latent Heat Gain:	561	BTUh	☑	☐ -
2.13 Design Sensible Heat Gain:	10,562	BTUh	☑	☐ -
2.14 Design Total Heat Gain:	11,123	BTUh	☑	☐ -
2.15 Design Total Heat Loss:	10,736	BTUh	☑	☐ -
2.16 Design Airflow: [13]	Equipment supply	CFM	☑	☐ -
2.17 Design Duct Static Pressure: [14]		In. Water Column	☐	☐ ☑
2.18 Full Load Calculations Report Attached [15]			☑	☐ -

3. Selected Cooling Equipment, If Cooling Equipment to be Installed				
3.1 Condenser Manufacturer & Model:	Samsung model JXH24		☑	☐ ☐
3.2 Evaporator / Fan Coil Manufacturer & Model:	Samsung model JNH12		☑	☐ ☐
3.3 AHRI Reference #: [16]	205291854		☑	☐ ☐
3.4 Listed Efficiency:	11.4 EER 18 SEER		☑	☐ ☐
3.5 Metering Device Type:	☐ TXV ☐ Fixed orifice ☑ Other:		☑	☐ ☐
3.6 Refrigerant Type:	☑ R-410a ☐ Other:		☑	☐ ☐
3.7 Fan Speed Type: [17]	☐ Fixed ☑ Variable (ECM / ICM) ☐ Other:		☑	☐ ☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18]		BTUh	☐	☐ ☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18]		BTUh	☐	☐ ☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18]	22,000	BTUh	☑	☐ ☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed			☐	☐ ☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]			☑	☐ ☐
3.13 AHRI Certificate Attached [16]			☐	☐ ☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed				
4.1 AHRI Listed Efficiency:	9.5 HSPF or Ground-Source:	COP	☑	☐ ☐
4.2 Performance at 17°F: Capacity	25000 BTUh Efficiency:	COP [20]	☑	☐ ☐
4.3 Performance at 47°F: Capacity	25000 BTUh Efficiency:	COP [20]	☑	☐ ☐

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HVAC System Quality Installation Contractor Checklist [1]

5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8,21]	☐	☐	☑
6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the **manufacturer-recommended** minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser: ____ °F DB		☐	☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode: ____ °F WB		☐	☑
6.3 Liquid line pressure: ____ psig		☐	☑
6.4 Liquid line temperature: ____ °F DB		☐	☑
6.5 Suction line pressure: ____ psig		☐	☑
6.6 Suction line temperature: ____ °F DB		☐	☑
7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____ °F DB (Using Value 6.3)		☐	☑
7.2 **Subcooling** value: _____ °F DB (Value 7.1 - Value 6.4)		☐	☑
7.3 OEM subcooling goal: _____ °F DB		☐	☑
7.4 Subcooling deviation: _____ °F DB (Value 7.2 – Value 7.3)		☐	☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____ °F DB (Using Value 6.5)		☐	☑
7.6 **Superheat** value: _____ °F DB (Value 6.6 – Value 7.5)		☐	☑
7.7 OEM **superheat** goal: _____ °F DB (Using superheat tables and Values 6.1 & 6.2)		☐	☑
7.8 Superheat deviation: _____ °F DB (Value 7.6 – Value 7.7)		☐	☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F		☐	☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or **super-heat** process and **documentation** has been attached that defines this procedure		☐	☑
8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan: ____ amperage _____line voltage		☐	☑
8.2 Condenser unit: ____ amperage _____line voltage		☐	☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value		☐	☑
9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM		☐	☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling		☐	☑
9.3 Return duct static pressure: _____ IWC Test Hole Location: [23] _____		☐	☑
9.4 Supply duct static pressure: _____ IWC Test Hole Location: [23] _____		☐	☑
9.5 Test hole locations are well-marked and accessible [23]		☐	☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM		☐	☑
10. Air Balance			
10.1 **Balancing** report **prepared** and attached **indicating** the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and **documented** through one of the following options:			
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, **documented** by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;		☐	☑
10.1.2 To be measured, documented, and verified by a Rater per Item 1.4.2 of the HVAC System QI Rater Checklist		☐	☑
11. System Controls			
11.1 Operating and safety controls meet OEM requirements		☐	☑
12. Drain pan			
12.1 Corrosion-resistant drain pan, properly sloped to drainage system, **included** with each HVAC component that produces condensate [25]		☐	☑

HVAC Company Name: Advanced Heating And Cooling — Credentialing Organization: ACCA / AE / Other

HVAC Contractor Name: Caleb Knutson — HVAC Contractor Signature: _____ Date: 5/8/23

Builder Name: [5] Visser Building — Builder Signature: [5] DAVID FIELDING Date: 5/22/23

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Notes:

1. This Checklist is designed to align with the requirements of ASHRAE 62.2-2010 and published addenda and ANSI / ACCA's 5 QI-2007 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.

   This Checklist applies to ventilation systems; to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65,000 Btu / h with forced-air distribution systems (i.e., ducts) and to furnaces up to 225,000 Btu / h with forced-air distribution systems (i.e., ducts). All other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems are exempt. If the ventilation system is the only applicable system installed in the home, then only Section 1 shall be completed.

   One Checklist shall be completed for each system and provided to the Rater.

2. Description of HVAC system location or area served (e.g., "whole house", "upper level", "lower level").
3. Check "Yes" if this system is to handle temporary occupant loads. Such a system may be required to accommodate a significant number of guests on a regular or sporadic basis and shall be handled by a supplemental cooling system (e.g., a small, single-package unit or split-coil unit) or by a system that can shift capacity from zone to zone (e.g., a variable volume system).
4. The person responsible for the heating, cooling, & ventilation design shall be responsible for completing Sections 1 and 2 of this Checklist.
5. For Sections 1 through 5, the 'Builder Verified' column shall be used to indicate items verified by the builder (or a firm or HERS Rater hired by the builder). If any Items have been marked 'Builder Verified', then the builder is responsible for these Items and must sign this Checklist. Note that builders are not permitted to verify any Items in Sections 6-12.
6. For Sections 1 through 5, the 'Cont. Verified' column shall be used to indicate Items verified by the credentialed contractor (or a firm or HERS Rater hired by the contractor). In contrast, for Sections 6 through 12, the 'Cont. Verified' column shall *only* be used to indicate Items verified by the credentialed contractor (i.e., neither a builder, nor a firm, nor a HERS Rater are permitted to verify Sections 6 - 12). The credentialed contractor is responsible for these Items and shall sign this Checklist.
7. For proper procedures, exceptions, and selection methods see ASHRAE 62.2-2010 and published addenda. All components shall be designed and installed per local codes, manufacturers' installation instructions, engineering documents, and regional ENERGY STAR program requirements.

   The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of an exhaust ventilation system. Outdoor air ducts connected to the return side of an air handler are allowed to be part of a supply ventilation system if manufacturer requirements for return air temperature are met.
8. Heating and cooling loads shall be calculated, equipment shall be selected, and duct systems shall be sized according to the latest editions of ACCA Manuals J, S, & D, respectively, 2009 ASHRAE Handbook of Fundamentals, or other methodology approved by the Authority Having Jurisdiction. The HVAC system design shall be completed for the specific configuration (e.g., plan, elevation, option, and orientation) of the home to be built except as permitted herein.

   For each house plan with multiple configurations (e.g., orientations, elevations, options), the loads shall be calculated for each potential configuration. If the loads across all configurations vary by ≤ 25%, then the largest load shall be permitted to be used for equipment selection for all configurations, subject to the over-sizing limits of ACCA Manual S. Otherwise, the contractor shall group the load for each configuration into a set with ≤ 25% variation and equipment selection shall be completed for each set of loads.

   For each house plan with multiple configurations, the room-level design airflows shall be calculated for each potential configuration. If the design airflows for each room vary across all configurations by ≤ 25% or 25 CFM, then the average room-level design airflow shall be permitted to be used when designing the duct system. Otherwise, the contractor shall group the room-level design airflow for each configuration into a set with ≤ 25% or 25 CFM variation and the duct design shall be completed for the average airflow of that set.
9. If the design conditions are dictated by a code or regulation, then the requirements of the lawful or controlling authority supersedes the Manual J or ASHRAE default design values. Otherwise, the default values shall be used. The values for the geographically closest location shall be selected or a justification provided for the selected location.
10. The number of occupants among all HVAC systems in the home must be equal to the number of bedrooms, as defined below, plus one. Occupants listed for systems that are indicated in the header as a cooling system for temporary occupant loads, as described in Footnote 3, shall be permitted to exceed this limit.

    A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

    An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

    - have a sill height of not more than 44 inches above the floor; AND
    - have a minimum net clear opening of 5.7 sq. ft.; AND
    - have a minimum net clear opening height of 24 in.; AND
    - have a minimum net clear opening width of 20 in.; AND
    - be operational from the inside of the room without the use of keys, tools or special knowledge.
11. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
12. Infiltration rate shall reflect value used in confirmed or projected HERS rating for rated home. Alternatively, use "Average" or "Semi-loose" values for the cooling season infiltration rates and "Semi-tight" or "Average" values for the heating season infiltration rates, as defined by ACCA Manual J, Eighth Edition, Version Two.

13. Design airflow is the design value(s) for the blower in CFM, as determined by using the manufacturer's expanded performance data to select equipment, per ACCA Manual S procedures.
14. Design duct static pressure shall account for the installation of a MERV 6 or higher filter.
15. The load calculation for the home shall be provided, documenting all design elements and all resulting loads, including but not limited to the values listed in Items 2.1 through 2.17.
16. All evaporators and condensing units shall be properly matched as demonstrated by an attached AHRI certificate. If an AHRI certificate is not available, a copy of OEM-provided catalog data indicating acceptable combination selection and performance data shall be attached.
17. If the whole-house ventilation system utilizes the HVAC air handler, then the fan speed type shall be ECM / ICM and variable speed, or include a controller (e.g., smart cycler) that reduces the ventilation run time by accounting for hours when HVAC system is heating or cooling the home.
18. Listed system capacity at design conditions is to be obtained from the OEM expanded performance data.
19. For cooling systems, the next largest nominal piece of equipment may be used that is available to satisfy the latent and sensible requirements. Single-speed systems generally have OEM nominal size increments of ½ ton. Multi-speed or multi-stage equipment may have OEM nominal size increments of one ton. Therefore, the use of these advanced system types can provide extra flexibility to meet the equipment sizing requirements.
20. Items 4.2 and 4.3 are not applicable to ground-source heat pumps.
21. For warm air heating systems, the output capacity must be between 100% and 140% of calculated system load unless a larger size is dictated by the cooling equipment selection.
22. Either factory-installed or field-installed TXV's may be used. For field-installed TXV's, ensure that sensing bulbs are insulated and tightly clamped to the vapor line with good linear thermal contact at the recommended orientation, usually 4 or 8 o'clock.
23. Examples of return or supply duct static pressure measurement locations are: plenum, cabinet, trunk duct, as well as front, back, left or right side. Test hole locations shall be well marked and accessible.
24. Ducts shall not include coiled or looped ductwork except to the extent needed for acoustical control. Balancing dampers or proper duct sizing shall be used instead of loops to limit flow to diffusers. When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers located in the duct boot are permitted.
25. Condensate pan shall be made of corrosion-resistant materials, to include galvanized steel and plastic. Drain pan shall drain condensate to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drainage system; and shall be equipped with a backflow prevention valve when drained to a shared drainage system, such as a storm water management system.

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1D 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-102A and FC-102B Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*			
2.1 Heat Loss / Gain Method: ☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:	☑	☐	-
2.2 Duct Design Method: ☐ Manual D ☑ Other: Engineer	☑	☐	☐
2.3 Equipment Selection Method: ☐ Manual S ☐ OEM Rec. ☑ Other: Engineer	☑	☐	-
2.4 Outdoor Design Temperatures: [9] Location: Boise 1%: 95 °F 99%: 10.! °F	☑	☐	-
2.5 Orientation of Rated Home (e.g., North, South): North	☑	☐	-
2.6 Number of Occupants Served by System: [10] 2	☑	☐	-
2.7 Conditioned Floor Area in Rated Home: 681 Sq. Ft.	☑	☐	-
2.8 Window Area in Rated Home: 51 Sq. Ft.	☑	☐	-
2.9 Predominant Window SHGC in Rated Home: [11] 0.46	☑	☐	-
2.10 Infiltration Rate in Rated Home: [12] Summer: average Winter: average	☑	☐	-
2.11 Mechanical Ventilation Rate in Rated Home: 40 CFM	☑	☐	-
2.12 Design Latent Heat Gain: 561 BTUh	☑	☐	-
2.13 Design Sensible Heat Gain: 7,855 BTUh	☑	☐	-
2.14 Design Total Heat Gain: 8,416 BTUh	☑	☐	-
2.15 Design Total Heat Loss: 8,004 BTUh	☑	☐	-
2.16 Design Airflow: [13] Equipment supply CFM	☑	☐	-
2.17 Design Duct Static Pressure: [14] In. Water Column	☐	☐	☑
2.18 Full Load Calculations Report Attached [15]	☑	☐	-

3. Selected Cooling Equipment, If Cooling Equipment to be Installed			
3.1 Condenser Manufacturer & Model: Samsung model JXH24	☑	☐	☐
3.2 Evaporator / Fan Coil Manufacturer & Model: Samsung model JNH12	☑	☐	☐
3.3 AHRI Reference #: [16] 205291854	☑	☐	☐
3.4 Listed Efficiency: 11.4 EER 18 SEER	☑	☐	☐
3.5 Metering Device Type: ☐ TXV ☐ Fixed orifice ☑ Other:	☑	☐	☐
3.6 Refrigerant Type: ☑ R-410a ☐ Other:	☑	☐	☐
3.7 Fan Speed Type: [17] ☐ Fixed ☑ Variable (ECM / ICM) ☐ Other:	☑	☐	☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18] BTUh	☐	☐	☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18] BTUh	☐	☐	☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18] 22,000 BTUh	☑	☐	☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed	☐	☐	☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]	☑	☐	☐
3.13 AHRI Certificate Attached [16]	☐	☐	☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed			
4.1 AHRI Listed Efficiency: 9.5 HSPF or Ground-Source: COP	☑	☐	☐
4.2 Performance at 17°F: Capacity 25000 BTUh Efficiency: COP [20]	☑	☐	☐
4.3 Performance at 47°F: Capacity 25000 BTUh Efficiency: COP [20]	☑	☐	☐

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
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5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8,21]	☐	☐	☑
6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser: ____ °F DB	☐		☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode: ____ °F WB	☐		☑
6.3 Liquid line pressure: ____ psig	☐		☑
6.4 Liquid line temperature: ____ °F DB	☐		☑
6.5 Suction line pressure: ____ psig	☐		☑
6.6 Suction line temperature: ____ °F DB	☐		☑
7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____ °F DB (Using Value 6.3)	☐		☑
7.2 Subcooling value: _____ °F DB (Value 7.1 - Value 6.4)	☐		☑
7.3 OEM subcooling goal: _____ °F DB	☐		☑
7.4 Subcooling deviation: _____ °F DB (Value 7.2 – Value 7.3)	☐		☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____ °F DB (Using Value 6.5)	☐		☑
7.6 Superheat value: _____ °F DB (Value 6.6 – Value 7.5)	☐		☑
7.7 OEM superheat goal: _____ °F DB (Using superheat tables and Values 6.1 & 6.2)	☐		☑
7.8 Superheat deviation: _____ °F DB (Value 7.6 – Value 7.7)	☐		☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F	☐		☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or super-heat process and documentation has been attached that defines this procedure	☐		☑
8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan: ____ amperage _____ line voltage	☐		☑
8.2 Condenser unit: ____ amperage _____ line voltage	☐		☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value	☐		☑
9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM	☐		☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling	☐		☑
9.3 Return duct static pressure: _____ IWC Test Hole Location: [23] _____	☐		☑
9.4 Supply duct static pressure: _____ IWC Test Hole Location: [23] _____	☐		☑
9.5 Test hole locations are well-marked and accessible [23]	☐		☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM	☐		☑
10. Air Balance			
10.1 Balancing report prepared and attached indicating the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and documented through one of the following options:			
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, documented by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;	☐		☑
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12.1 Corrosion-resistant drain pan, properly sloped to drainage system, included with each HVAC component that produces condensate [25]	☐		☑

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HVAC Contractor Name: Caleb Knutson HVAC Contractor Signature: _____ Date: 5/8/23

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    - have a minimum net clear opening width of 20 in.; AND
    - be operational from the inside of the room without the use of keys, tools or special knowledge.
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25. Condensate pan shall be made of corrosion-resistant materials, to include galvanized steel and plastic. Drain pan shall drain condensate to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drainage system; and shall be equipped with a backflow prevention valve when drained to a shared drainage system, such as a storm water management system.

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1C 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-102A and FC-102B Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*				
2.1 Heat Loss / Gain Method: ☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:		☑	☐	-
2.2 Duct Design Method: ☐ Manual D ☑ Other: Engineer		☑	☐	☐
2.3 Equipment Selection Method: ☐ Manual S ☐ OEM Rec. ☑ Other: Engineer		☑	☐	-
2.4 Outdoor Design Temperatures: [9] Location: Boise 1%: 95 °F 99%: 10.! °F		☑	☐	-
2.5 Orientation of Rated Home (e.g., North, South):	North	☑	☐	-
2.6 Number of Occupants Served by System: [10]	2	☑	☐	-
2.7 Conditioned Floor Area in Rated Home:	697 Sq. Ft.	☑	☐	-
2.8 Window Area in Rated Home:	123 Sq. Ft.	☑	☐	-
2.9 Predominant Window SHGC in Rated Home: [11]	0.46	☑	☐	-
2.10 Infiltration Rate in Rated Home: [12]	Summer: average Winter: average	☑	☐	-
2.11 Mechanical Ventilation Rate in Rated Home:	45 CFM	☑	☐	-
2.12 Design Latent Heat Gain:	561 BTUh	☑	☐	-
2.13 Design Sensible Heat Gain:	11,560 BTUh	☑	☐	-
2.14 Design Total Heat Gain:	12,121 BTUh	☑	☐	-
2.15 Design Total Heat Loss:	11,236 BTUh	☑	☐	-
2.16 Design Airflow: [13]	Equipment supply CFM	☑	☐	-
2.17 Design Duct Static Pressure: [14]	In. Water Column	☐	☐	☑
2.18 Full Load Calculations Report Attached [15]		☑	☐	-

3. Selected Cooling Equipment, If Cooling Equipment to be Installed				
3.1 Condenser Manufacturer & Model:	Samsung model JXH24	☑	☐	☐
3.2 Evaporator / Fan Coil Manufacturer & Model:	Samsung model JNH12	☑	☐	☐
3.3 AHRI Reference #: [16]	205291854	☑	☐	☐
3.4 Listed Efficiency:	11.4 EER 18 SEER	☑	☐	☐
3.5 Metering Device Type: ☐ TXV ☐ Fixed orifice ☑ Other:		☑	☐	☐
3.6 Refrigerant Type: ☑ R-410a ☐ Other:		☑	☐	☐
3.7 Fan Speed Type: [17] ☐ Fixed ☑ Variable (ECM / ICM) ☐ Other:		☑	☐	☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18]	BTUh	☐	☐	☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18]	BTUh	☐	☐	☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18]	22,000 BTUh	☑	☐	☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed		☐	☐	☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]		☑	☐	☐
3.13 AHRI Certificate Attached [16]		☐	☐	☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed				
4.1 AHRI Listed Efficiency: 9.5 HSPF or Ground-Source: COP		☑	☐	☐
4.2 Performance at 17°F: Capacity 25000 BTUh Efficiency: COP [20]		☑	☐	☐
4.3 Performance at 47°F: Capacity 25000 BTUh Efficiency: COP [20]		☑	☐	☐

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5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8,21]	☐	☐	☑
6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser: ____ °F DB		☐	☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode: ____ °F WB		☐	☑
6.3 Liquid line pressure: ____ psig		☐	☑
6.4 Liquid line temperature: ____ °F DB		☐	☑
6.5 Suction line pressure: ____ psig		☐	☑
6.6 Suction line temperature: ____ °F DB		☐	☑
7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____ °F DB (Using Value 6.3)		☐	☑
7.2 Subcooling value: _____ °F DB (Value 7.1 - Value 6.4)		☐	☑
7.3 OEM subcooling goal: _____ °F DB		☐	☑
7.4 Subcooling deviation: _____ °F DB (Value 7.2 – Value 7.3)		☐	☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____ °F DB (Using Value 6.5)		☐	☑
7.6 Superheat value: _____ °F DB (Value 6.6 – Value 7.5)		☐	☑
7.7 OEM superheat goal: _____ °F DB (Using superheat tables and Values 6.1 & 6.2)		☐	☑
7.8 Superheat deviation: _____ °F DB (Value 7.6 – Value 7.7)		☐	☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F		☐	☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or super-heat process and documentation has been attached that defines this procedure		☐	☑
8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan: ____ amperage _____ line voltage		☐	☑
8.2 Condenser unit: ____ amperage _____ line voltage		☐	☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value		☐	☑
9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM		☐	☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling		☐	☑
9.3 Return duct static pressure: _____ IWC Test Hole Location: [23] _____		☐	☑
9.4 Supply duct static pressure: _____ IWC Test Hole Location: [23] _____		☐	☑
9.5 Test hole locations are well-marked and accessible [23]		☐	☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM		☐	☑
10. Air Balance			
10.1 Balancing report prepared and attached indicating the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and documented through one of the following options:			
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, documented by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;		☐	☑
10.1.2 To be measured, documented, and verified by a Rater per Item 1.4.2 of the HVAC System QI Rater Checklist		☐	☑
11. System Controls			
11.1 Operating and safety controls meet OEM requirements		☐	☑
12. Drain pan			
12.1 Corrosion-resistant drain pan, properly sloped to drainage system, included with each HVAC component that produces condensate [25]		☐	☑

HVAC Company Name: Advanced Heating And Cooling — Credentialing Organization: ACCA / AE / Other

HVAC Contractor Name: Caleb Knutson — HVAC Contractor Signature: _____ — Date: 5/8/23

Builder Name: [5] VISSER BUILDING — Builder Signature: [5] David Fielding — Date: 5/22/23

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Notes:

1. This Checklist is designed to align with the requirements of ASHRAE 62.2-2010 and published addenda and ANSI / ACCA's 5 QI-2007 protocol, thereby improving the performance of HVAC equipment in new homes when compared to homes built to minimum code. However, these features alone cannot prevent all ventilation, indoor air quality, and HVAC problems (e.g., those caused by a lack of maintenance by occupants). Therefore, this Checklist is not a guarantee of proper ventilation, indoor air quality, or HVAC performance.

   This Checklist applies to ventilation systems; to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65,000 Btu / h with forced-air distribution systems (i.e., ducts) and to furnaces up to 225,000 Btu / h with forced-air distribution systems (i.e., ducts). All other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems are exempt. If the ventilation system is the only applicable system installed in the home, then only Section 1 shall be completed.

   One Checklist shall be completed for each system and provided to the Rater.

2. Description of HVAC system location or area served (e.g., "whole house", "upper level", "lower level").
3. Check "Yes" if this system is to handle temporary occupant loads. Such a system may be required to accommodate a significant number of guests on a regular or sporadic basis and shall be handled by a supplemental cooling system (e.g., a small, single-package unit or split-coil unit) or by a system that can shift capacity from zone to zone (e.g., a variable volume system).
4. The person responsible for the heating, cooling, & ventilation design shall be responsible for completing Sections 1 and 2 of this Checklist.
5. For Sections 1 through 5, the 'Builder Verified' column shall be used to indicate items verified by the builder (or a firm or HERS Rater hired by the builder). If any Items have been marked 'Builder Verified', then the builder is responsible for these Items and must sign this Checklist. Note that builders are not permitted to verify any Items in Sections 6-12.
6. For Sections 1 through 5, the 'Cont. Verified' column shall be used to indicate Items verified by the credentialed contractor (or a firm or HERS Rater hired by the contractor). In contrast, for Sections 6 through 12, the 'Cont. Verified' column shall *only* be used to indicate Items verified by the credentialed contractor (i.e., neither a builder, nor a firm, nor a HERS Rater are permitted to verify Sections 6 - 12). The credentialed contractor is responsible for these Items and shall sign this Checklist.
7. For proper procedures, exceptions, and selection methods see ASHRAE 62.2-2010 and published addenda. All components shall be designed and installed per local codes, manufacturers' installation instructions, engineering documents, and regional ENERGY STAR program requirements.

   The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of an exhaust ventilation system. Outdoor air ducts connected to the return side of an air handler are allowed to be part of a supply ventilation system if manufacturer requirements for return air temperature are met.
8. Heating and cooling loads shall be calculated, equipment shall be selected, and duct systems shall be sized according to the latest editions of ACCA Manuals J, S, & D, respectively, 2009 ASHRAE Handbook of Fundamentals, or other methodology approved by the Authority Having Jurisdiction. The HVAC system design shall be completed for the specific configuration (e.g., plan, elevation, option, and orientation) of the home to be built except as permitted herein.

   For each house plan with multiple configurations (e.g., orientations, elevations, options), the loads shall be calculated for each potential configuration. If the loads across all configurations vary by ≤ 25%, then the largest load shall be permitted to be used for equipment selection for all configurations, subject to the over-sizing limits of ACCA Manual S. Otherwise, the contractor shall group the load for each configuration into a set with ≤ 25% variation and equipment selection shall be completed for each set of loads.

   For each house plan with multiple configurations, the room-level design airflows shall be calculated for each potential configuration. If the design airflows for each room vary across all configurations by ≤ 25% or 25 CFM, then the average room-level design airflow shall be permitted to be used when designing the duct system. Otherwise, the contractor shall group the room-level design airflow for each configuration into a set with ≤ 25% or 25 CFM variation and the duct design shall be completed for the average airflow of that set.
9. If the design conditions are dictated by a code or regulation, then the requirements of the lawful or controlling authority supersedes the Manual J or ASHRAE default design values. Otherwise, the default values shall be used. The values for the geographically closest location shall be selected or a justification provided for the selected location.
10. The number of occupants among all HVAC systems in the home must be equal to the number of bedrooms, as defined below, plus one. Occupants listed for systems that are indicated in the header as a cooling system for temporary occupant loads, as described in Footnote 3, shall be permitted to exceed this limit.

    A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

    An egress window, as defined in 2009 IRC section R310, shall refer to any operable window that provides for a means of escape and access for rescue in the event of an emergency. The egress window definition has been summarized for convenience. The egress window shall:

    - have a sill height of not more than 44 inches above the floor; AND
    - have a minimum net clear opening of 5.7 sq. ft.; AND
    - have a minimum net clear opening height of 24 in.; AND
    - have a minimum net clear opening width of 20 in.; AND
    - be operational from the inside of the room without the use of keys, tools or special knowledge.
11. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
12. Infiltration rate shall reflect value used in confirmed or projected HERS rating for rated home. Alternatively, use "Average" or "Semi-loose" values for the cooling season infiltration rates and "Semi-tight" or "Average" values for the heating season infiltration rates, as defined by ACCA Manual J, Eighth Edition, Version Two.

13. Design airflow is the design value(s) for the blower in CFM, as determined by using the manufacturer's expanded performance data to select equipment, per ACCA Manual S procedures.
14. Design duct static pressure shall account for the installation of a MERV 6 or higher filter.
15. The load calculation for the home shall be provided, documenting all design elements and all resulting loads, including but not limited to the values listed in Items 2.1 through 2.17.
16. All evaporators and condensing units shall be properly matched as demonstrated by an attached AHRI certificate. If an AHRI certificate is not available, a copy of OEM-provided catalog data indicating acceptable combination selection and performance data shall be attached.
17. If the whole-house ventilation system utilizes the HVAC air handler, then the fan speed type shall be ECM / ICM and variable speed, or include a controller (e.g., smart cycler) that reduces the ventilation run time by accounting for hours when HVAC system is heating or cooling the home.
18. Listed system capacity at design conditions is to be obtained from the OEM expanded performance data.
19. For cooling systems, the next largest nominal piece of equipment may be used that is available to satisfy the latent and sensible requirements. Single-speed systems generally have OEM nominal size increments of ½ ton. Multi-speed or multi-stage equipment may have OEM nominal size increments of one ton. Therefore, the use of these advanced system types can provide extra flexibility to meet the equipment sizing requirements.
20. Items 4.2 and 4.3 are not applicable to ground-source heat pumps.
21. For warm air heating systems, the output capacity must be between 100% and 140% of calculated system load unless a larger size is dictated by the cooling equipment selection.
22. Either factory-installed or field-installed TXV's may be used. For field-installed TXV's, ensure that sensing bulbs are insulated and tightly clamped to the vapor line with good linear thermal contact at the recommended orientation, usually 4 or 8 o'clock.
23. Examples of return or supply duct static pressure measurement locations are: plenum, cabinet, trunk duct, as well as front, back, left or right side. Test hole locations shall be well marked and accessible.
24. Ducts shall not include coiled or looped ductwork except to the extent needed for acoustical control. Balancing dampers or proper duct sizing shall be used instead of loops to limit flow to diffusers. When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers located in the duct boot are permitted.
25. Condensate pan shall be made of corrosion-resistant materials, to include galvanized steel and plastic. Drain pan shall drain condensate to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drainage system; and shall be equipped with a backflow prevention valve when drained to a shared drainage system, such as a storm water management system.

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HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1B 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-102A and FC-102B Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*					
2.1 Heat Loss / Gain Method:	☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:			☑	☐ -
2.2 Duct Design Method:	☐ Manual D	☑ Other:	Engineer	☑	☐ ☐
2.3 Equipment Selection Method:	☐ Manual S ☐ OEM Rec.	☑ Other:	Engineer	☑	☐ -
2.4 Outdoor Design Temperatures: [9]	Location: Boise	1%: 95 °F	99%: 10.5 °F	☑	☐ -
2.5 Orientation of Rated Home (e.g., North, South):	North			☑	☐ -
2.6 Number of Occupants Served by System: [10]	2			☑	☐ -
2.7 Conditioned Floor Area in Rated Home:	555 Sq. Ft.			☑	☐ -
2.8 Window Area in Rated Home:	20 Sq. Ft.			☑	☐ -
2.9 Predominant Window SHGC in Rated Home: [11]	0.46			☑	☐ -
2.10 Infiltration Rate in Rated Home: [12]	Summer: average	Winter: average		☑	☐ -
2.11 Mechanical Ventilation Rate in Rated Home:	35 CFM			☑	☐ -
2.12 Design Latent Heat Gain:	561 BTUh			☑	☐ -
2.13 Design Sensible Heat Gain:	6,233 BTUh			☑	☐ -
2.14 Design Total Heat Gain:	6,794 BTUh			☑	☐ -
2.15 Design Total Heat Loss:	6,010 BTUh			☑	☐ -
2.16 Design Airflow: [13]	Equipment supply CFM			☑	☐ -
2.17 Design Duct Static Pressure: [14]	In. Water Column			☐	☐ ☑
2.18 Full Load Calculations Report Attached [15]				☑	☐ -

3. Selected Cooling Equipment, If Cooling Equipment to be Installed					
3.1 Condenser Manufacturer & Model:	Samsung model JXH24			☑	☐ ☐
3.2 Evaporator / Fan Coil Manufacturer & Model:	Samsung model JNH12			☑	☐ ☐
3.3 AHRI Reference #: [16]	205291854			☑	☐ ☐
3.4 Listed Efficiency:	11.4 EER	18 SEER		☑	☐ ☐
3.5 Metering Device Type:	☐ TXV	☐ Fixed orifice	☑ Other:	☑	☐ ☐
3.6 Refrigerant Type:	☑ R-410a	☐ Other:		☑	☐ ☐
3.7 Fan Speed Type: [17]	☐ Fixed	☑ Variable (ECM / ICM)	☐ Other:	☑	☐ ☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18]	BTUh			☐	☐ ☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18]	BTUh			☐	☐ ☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18]	22,000 BTUh			☑	☐ ☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed				☐	☐ ☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]				☑	☐ ☐
3.13 AHRI Certificate Attached [16]				☐	☐ ☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed							
4.1 AHRI Listed Efficiency:	9.5	HSPF or Ground-Source:		COP	☑	☐	☐
4.2 Performance at 17°F:	Capacity 25000 BTUh	Efficiency:		COP [20]	☑	☐	☐
4.3 Performance at 47°F:	Capacity 25000 BTUh	Efficiency:		COP [20]	☑	☐	☐

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5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8,21]	☐	☐	☑

6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser:	____ °F DB	☐	☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode:	____ °F WB	☐	☑
6.3 Liquid line pressure:	____ psig	☐	☑
6.4 Liquid line temperature:	____ °F DB	☐	☑
6.5 Suction line pressure:	____ psig	☐	☑
6.6 Suction line temperature:	____ °F DB	☐	☑

7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____	°F DB (Using Value 6.3)	☐	☑
7.2 Subcooling value: _____	°F DB (Value 7.1 - Value 6.4)	☐	☑
7.3 OEM subcooling goal: _____	°F DB	☐	☑
7.4 Subcooling deviation: _____	°F DB (Value 7.2 – Value 7.3)	☐	☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____	°F DB (Using Value 6.5)	☐	☑
7.6 Superheat value: _____	°F DB (Value 6.6 – Value 7.5)	☐	☑
7.7 OEM superheat goal: _____	°F DB (Using superheat tables and Values 6.1 & 6.2)	☐	☑
7.8 Superheat deviation: _____	°F DB (Value 7.6 – Value 7.7)	☐	☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F		☐	☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or super-heat process and documentation has been attached that defines this procedure		☐	☑

8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan:	____ amperage _____ line voltage	☐	☑
8.2 Condenser unit:	____ amperage _____ line voltage	☐	☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value		☐	☑

9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM		☐	☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling		☐	☑
9.3 Return duct static pressure: _____ IWC	Test Hole Location: [23] _____	☐	☑
9.4 Supply duct static pressure: _____ IWC	Test Hole Location: [23] _____	☐	☑
9.5 Test hole locations are well-marked and accessible [23]		☐	☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM		☐	☑

10. Air Balance		
10.1 Balancing report prepared and attached indicating the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and documented through one of the following options:		
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, documented by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;	☐	☑
10.1.2 To be measured, documented, and verified by a Rater per Item 1.4.2 of the HVAC System QI Rater Checklist	☐	☑

11. System Controls		
11.1 Operating and safety controls meet OEM requirements	☐	☑

12. Drain pan		
12.1 Corrosion-resistant drain pan, properly sloped to drainage system, included with each HVAC component that produces condensate [25]	☐	☑

HVAC Company Name: Advanced Heating And Cooling — Credentialing Organization: ACCA / AE / Other

HVAC Contractor Name: Caleb Knutson — HVAC Contractor Signature: _____ — Date: 5/8/23

Builder Name: [5] Visser Building — Builder Signature: [5] DAVID Fielding — Date: 5/22/23

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Notes:

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   One Checklist shall be completed for each system and provided to the Rater.

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4. The person responsible for the heating, cooling, & ventilation design shall be responsible for completing Sections 1 and 2 of this Checklist.
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8. Heating and cooling loads shall be calculated, equipment shall be selected, and duct systems shall be sized according to the latest editions of ACCA Manuals J, S, & D, respectively, 2009 ASHRAE Handbook of Fundamentals, or other methodology approved by the Authority Having Jurisdiction. The HVAC system design shall be completed for the specific configuration (e.g., plan, elevation, option, and orientation) of the home to be built except as permitted herein.

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10. The number of occupants among all HVAC systems in the home must be equal to the number of bedrooms, as defined below, plus one. Occupants listed for systems that are indicated in the header as a cooling system for temporary occupant loads, as described in Footnote 3, shall be permitted to exceed this limit.

    A bedroom is defined by RESNET as a room or space 70 sq. ft. or greater size, with egress window and closet, used or intended to be used for sleeping. A "den", "library", or "home office" with a closet, egress window, and 70 sq. ft. or greater size or other similar rooms shall count as a bedroom, but living rooms and foyers shall not.

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    - have a sill height of not more than 44 inches above the floor; AND
    - have a minimum net clear opening of 5.7 sq. ft.; AND
    - have a minimum net clear opening height of 24 in.; AND
    - have a minimum net clear opening width of 20 in.; AND
    - be operational from the inside of the room without the use of keys, tools or special knowledge.
11. "Predominant" is defined as the SHGC value used in the greatest amount of window area in the home.
12. Infiltration rate shall reflect value used in confirmed or projected HERS rating for rated home. Alternatively, use "Average" or "Semi-loose" values for the cooling season infiltration rates and "Semi-tight" or "Average" values for the heating season infiltration rates, as defined by ACCA Manual J, Eighth Edition, Version Two.

13. Design airflow is the design value(s) for the blower in CFM, as determined by using the manufacturer's expanded performance data to select equipment, per ACCA Manual S procedures.
14. Design duct static pressure shall account for the installation of a MERV 6 or higher filter.
15. The load calculation for the home shall be provided, documenting all design elements and all resulting loads, including but not limited to the values listed in Items 2.1 through 2.17.
16. All evaporators and condensing units shall be properly matched as demonstrated by an attached AHRI certificate. If an AHRI certificate is not available, a copy of OEM-provided catalog data indicating acceptable combination selection and performance data shall be attached.
17. If the whole-house ventilation system utilizes the HVAC air handler, then the fan speed type shall be ECM / ICM and variable speed, or include a controller (e.g., smart cycler) that reduces the ventilation run time by accounting for hours when HVAC system is heating or cooling the home.
18. Listed system capacity at design conditions is to be obtained from the OEM expanded performance data.
19. For cooling systems, the next largest nominal piece of equipment may be used that is available to satisfy the latent and sensible requirements. Single-speed systems generally have OEM nominal size increments of ½ ton. Multi-speed or multi-stage equipment may have OEM nominal size increments of one ton. Therefore, the use of these advanced system types can provide extra flexibility to meet the equipment sizing requirements.
20. Items 4.2 and 4.3 are not applicable to ground-source heat pumps.
21. For warm air heating systems, the output capacity must be between 100% and 140% of calculated system load unless a larger size is dictated by the cooling equipment selection.
22. Either factory-installed or field-installed TXV's may be used. For field-installed TXV's, ensure that sensing bulbs are insulated and tightly clamped to the vapor line with good linear thermal contact at the recommended orientation, usually 4 or 8 o'clock.
23. Examples of return or supply duct static pressure measurement locations are: plenum, cabinet, trunk duct, as well as front, back, left or right side. Test hole locations shall be well marked and accessible.
24. Ducts shall not include coiled or looped ductwork except to the extent needed for acoustical control. Balancing dampers or proper duct sizing shall be used instead of loops to limit flow to diffusers. When balancing dampers are used, they shall be located at the trunk to limit noise unless the trunk will not be accessible when the balancing process is conducted. In such cases, Opposable Blade Dampers (OBD) or dampers located in the duct boot are permitted.
25. Condensate pan shall be made of corrosion-resistant materials, to include galvanized steel and plastic. Drain pan shall drain condensate to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drainage system; and shall be equipped with a backflow prevention valve when drained to a shared drainage system, such as a storm water management system.

ENERGY STAR Certified Homes, Version 3 (Rev. 07)
HVAC System Quality Installation Contractor Checklist [1]

Home Address: Unit 1A 1715 W. IDAHO ST City: Boise State: ID Zip Code: 83702

System Description [2] FC-102A and FC-102B Cooling system for temporary occupant load? [3] Yes ☐ No ☑

1. Whole-Building Mechanical Ventilation Design [4]	Builder Verified [5]	Cont. Verified [6]	N/A
1.1 Ventilation system installed that has been designed to meet ASHRAE 62.2-2010 requirements including, but not limited to, requirements in Items 1.2-1.5. [7]	☑	☑	-
1.2 Ventilation system does not utilize an intake duct to the return side of the HVAC system unless the system is designed to operate intermittently and automatically based on a timer and to restrict outdoor air intake when not in use (e.g., motorized damper).	☑	☑	-
1.3 Documentation is attached with ventilation system type, location, design rate, and frequency and duration of each ventilation cycle.	☑	☑	-
1.4 If present, continuously-operating vent. & exhaust fans designed to operate during all occupiable hours.	☐	☐	☑
1.5 If present, intermittently-operating whole-house ventilation system designed to automatically operate at least once per day and at least 10% of every 24 hours.	☐	☐	☑

2. Heating & Cooling System Design [4,8] - *Parameters used in the design calculations shall reflect home to be built, specifically, outdoor design temperatures, home orientation, number of bedrooms, conditioned floor area, window area, predominant window performance and insulation levels, infiltration rate, mechanical ventilation rate, presence of MERV6 or better filter, and indoor temperature setpoints = 70°F for heating; 75°F for cooling.*				
2.1 Heat Loss / Gain Method:	☐ Manual J v8 ☑ 2009 ASHRAE ☐ Other:		☑	☐ -
2.2 Duct Design Method:	☐ Manual D ☑ Other: Engineer		☑	☐ ☐
2.3 Equipment Selection Method:	☐ Manual S ☐ OEM Rec. ☑ Other: Engineer		☑	☐ -
2.4 Outdoor Design Temperatures: [9]	Location: Boise 1%: 95 °F 99%: 10.! °F		☑	☐ -
2.5 Orientation of Rated Home (e.g., North, South):	North		☑	☐ -
2.6 Number of Occupants Served by System: [10]	2		☑	☐ -
2.7 Conditioned Floor Area in Rated Home:	586	Sq. Ft.	☑	☐ -
2.8 Window Area in Rated Home:	76	Sq. Ft.	☑	☐ -
2.9 Predominant Window SHGC in Rated Home: [11]	0.46		☑	☐ -
2.10 Infiltration Rate in Rated Home: [12]	Summer: average Winter: average		☑	☐ -
2.11 Mechanical Ventilation Rate in Rated Home:	35	CFM	☑	☐ -
2.12 Design Latent Heat Gain:	561	BTUh	☑	☐ -
2.13 Design Sensible Heat Gain:	10,893	BTUh	☑	☐ -
2.14 Design Total Heat Gain:	11,454	BTUh	☑	☐ -
2.15 Design Total Heat Loss:	9,641	BTUh	☑	☐ -
2.16 Design Airflow: [13]	Equipment supply	CFM	☑	☐ -
2.17 Design Duct Static Pressure: [14]		In. Water Column	☐	☐ ☑
2.18 Full Load Calculations Report Attached [15]			☑	☐ -

3. Selected Cooling Equipment, If Cooling Equipment to be Installed				
3.1 Condenser Manufacturer & Model:	Samsung model JXH24		☑	☐ ☐
3.2 Evaporator / Fan Coil Manufacturer & Model:	Samsung model JNH12		☑	☐ ☐
3.3 AHRI Reference #: [16]	205291854		☑	☐ ☐
3.4 Listed Efficiency:	11.4 EER 18 SEER		☑	☐ ☐
3.5 Metering Device Type:	☐ TXV ☐ Fixed orifice ☑ Other:		☑	☐ ☐
3.6 Refrigerant Type:	☑ R-410a ☐ Other:		☑	☐ ☐
3.7 Fan Speed Type: [17]	☐ Fixed ☑ Variable (ECM / ICM) ☐ Other:		☑	☐ ☐
3.8 Listed Sys. Latent Capacity at Design Cond.: [18]		BTUh	☐	☐ ☑
3.9 Listed Sys. Sensible Capacity at Design Cond.: [18]		BTUh	☐	☐ ☑
3.10 Listed Sys. Total Capacity at Design Cond.: [18]	22,000	BTUh	☑	☐ ☐
3.11 If Listed Sys. Latent Capacity (Value 3.8) ≤ Design Latent Heat Gain (Value 2.12), ENERGY STAR certified dehumidifier installed			☐	☐ ☑
3.12 Listed Sys. Total Capacity (Value 3.10) is 95-115% of Design Total Heat Gain (Value 2.14) or next nominal size [8, 19]			☑	☐ ☐
3.13 AHRI Certificate Attached [16]			☐	☐ ☑

4. Selected Heat Pump Equipment, If Heatpump to be Installed				
4.1 AHRI Listed Efficiency:	9.5 HSPF or Ground-Source:	COP	☑	☐ ☐
4.2 Performance at 17°F:	Capacity 25000 BTUh Efficiency:	COP [20]	☑	☐ ☐
4.3 Performance at 47°F:	Capacity 25000 BTUh Efficiency:	COP [20]	☑	☐ ☐

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5. Selected Furnace, If Furnace to be Installed	Builder Verified [5]	Cont. Verified [6]	N/A
5.1 Furnace Manufacturer & Model: _____	☐	☐	☑
5.2 Listed Efficiency: _____ AFUE	☐	☐	☑
5.3 Listed Output Heating Capacity: _____ BTUh	☐	☐	☑
5.4 Listed Output Heat. Cap. (Value 5.3) is 100-140% of Design Total Heat Loss (Value 2.15) or next nominal size [8,21]	☐	☐	☑
6. Refrigerant Tests - *Run system for 15 minutes before testing* Note: If outdoor ambient temperature at the condenser is ≤ 55°F or, if known, below the manufacturer-recommended minimum operating temperature for the cooling cycle, then the system shall include a TXV, and the contractor shall mark "N/A" on the Checklist for Section 6 & 7. [22]			
6.1 Outdoor ambient temperature at condenser: ____ °F DB	☐		☑
6.2 Return-side air temperature inside duct near evaporator, during cooling mode: ____ °F WB	☐		☑
6.3 Liquid line pressure: ____ psig	☐		☑
6.4 Liquid line temperature: ____ °F DB	☐		☑
6.5 Suction line pressure: ____ psig	☐		☑
6.6 Suction line temperature: ____ °F DB	☐		☑
7. Refrigerant Calculations			
For System with Thermal Expansion Valve (TXV):			
7.1 Condenser saturation temperature: _____ °F DB (Using Value 6.3)	☐		☑
7.2 Subcooling value: _____ °F DB (Value 7.1 - Value 6.4)	☐		☑
7.3 OEM subcooling goal: _____ °F DB	☐		☑
7.4 Subcooling deviation: _____ °F DB (Value 7.2 – Value 7.3)	☐		☑
For System with Fixed Orifice:			
7.5 Evaporator saturation temperature: _____ °F DB (Using Value 6.5)	☐		☑
7.6 Superheat value: _____ °F DB (Value 6.6 – Value 7.5)	☐		☑
7.7 OEM superheat goal: _____ °F DB (Using superheat tables and Values 6.1 & 6.2)	☐		☑
7.8 Superheat deviation: _____ °F DB (Value 7.6 – Value 7.7)	☐		☑
7.9 Value 7.4 is ± 3°F or Value 7.8 is ± 5°F	☐		☑
7.10 An OEM test procedure (e.g., as defined for a ground-source heat pump) has been used in place of sub-cooling or super-heat process and documentation has been attached that defines this procedure	☐		☑
8. Electrical Measurements – *Taken at electrical disconnect while component is in operation*			
8.1 Evaporator or furnace air handler fan: ____ amperage _____ line voltage	☐		☑
8.2 Condenser unit: ____ amperage _____ line voltage	☐		☑
8.3 Electrical measurements within OEM-specified tolerance of nameplate value	☐		☑
9. Air Flow Tests			
9.1 Air volume at evaporator: _____ CFM	☐		☑
9.2 Test performed in which mode? ☐ Heating ☐ Cooling	☐		☑
9.3 Return duct static pressure: _____ IWC Test Hole Location: [23] _____	☐		☑
9.4 Supply duct static pressure: _____ IWC Test Hole Location: [23] _____	☐		☑
9.5 Test hole locations are well-marked and accessible [23]	☐		☑
9.6 Airflow volume at evaporator (Value 9.1), at fan design speed and full operating load, ± 15% of the airflow required per system design (Value 2.16) or within range recommended by OEM	☐		☑
10. Air Balance			
10.1 Balancing report prepared and attached indicating the room name and design airflow for each supply and return register. In addition, final individual room airflows measured and documented through one of the following options:			
10.1.1 Measured by contractor using ANSI / ACCA 5 QI-2007 protocol, documented by contractor on the balancing report, & verified by contractor to be within the greater of ± 20% or 25 CFM of design airflow [24], OR;	☐		☑
10.1.2 To be measured, documented, and verified by a Rater per Item 1.4.2 of the HVAC System QI Rater Checklist	☐		☑
11. System Controls			
11.1 Operating and safety controls meet OEM requirements	☐		☑
12. Drain pan			
12.1 Corrosion-resistant drain pan, properly sloped to drainage system, included with each HVAC component that produces condensate [25]	☐		☑

HVAC Company Name: Advanced Heating And Cooling — Credentialing Organization: ACCA / AE / Other

HVAC Contractor Name: Caleb Knutson — HVAC Contractor Signature: _____ — Date: 5/8/23

Builder Name: [5] Visser Building — Builder Signature: [5] David Visser Building — Date: 5/22/23

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