The Residence at Carter Lake

AS-DESIGNED ENERGY REPORT

August 5th, 2025

HEARTLAND
ENERGY CONSULTANTS

PROJECT CHARACTERISTICS

Location: Ninth Street and Avenue K, Carter Lake, IA
Number of Units: 54
Total Units Tested: 6 – IFA Sampling Protocol
Description of Building: The Residence at Carter Lake is a 3-story, wood-framed building over slab-on-grade consisting of 54 units and common space. The project was funded through 2025 IFA 9% QAP.

PROGRAM REQUIREMENTS

- ✓ 2025 IFA 9% QAP
  - HERS ≤ 70

SUMMARY/NARRATIVE

This report outlines compliance with IFA energy efficiency requirements and required steps for on-site verification. This report is based on plans and specifications issued 7-23-2025 from JRG Architects. Compliance with program requirements will be verified through a combination of modeling using RESNET-approved software, on-site inspections, and completion of required program documentation.

This report does not guarantee compliance with IFA requirements. The Residence at Carter Lake project will be required to perform on-site verification, performance testing, quality installation, and checklist documentation.

SPECIFIED COMPONENTS

Listed below in the following table are select building components influencing energy modeling and program compliance. This list is not all-inclusive and serves as a summary of key components for quick reference. **Any changes following the issuance of this report must be verified with Heartland Energy Consultant's project manager and approved. Failure to do so may result in non-compliance with IFA requirements.**

COMPONENT	SPECIFIED	NOTES
Perimeter Slab Insulation	R-10, 2'	
Floor Insulation	N/A	
Exterior Walls Insulation	R-21	2x6 Wood Framed, High Density Fiberglass Batt
Window U-Value	0.27	
Window SHGC	NR	
Rim Joist Insulation	R-21	Fiberglass Batt
Roof Insulation	R-49	
Heating Equipment	9 HSPF2	Ducted ASHP
Cooling Equipment	17.1 SEER2	
Thermostat	Programmable	
Ventilation	Exhaust Only	Energy Star Rated Bath Fan, ASHRAE 62.2 Timer
Water Heating Equipment	0.93 UEF	In-Unit, Electric Storage
Ductwork Location	Conditioned Space	
Ductwork Insulation	N/A	
Interior Lighting	100% LED	80% Must be Energy Star Rated
Exterior Lighting	100% LED	
Fridge	Energy Star Rated	
Dishwasher	Energy Star Rated	
Kitchen Exhaust	N/A	
Clothes Washer	Energy Star Rated	
Clothes Dryer	Energy Star Rated	

REQUIRED CHECKLISTS AND PROGRAM DOCUMENTS

IFA requires completion of several checklists to verify compliance with program requirements. The required checklists, expected completion milestones, and the responsible party are listed below. **The developer/contractor is responsible for verifying checklists are included in applicable scopes of work prior. Failure to incorporate program documentation in scopes of work may result in delays or costly change orders.**

RESPONSIBLE PARTY	DESIGN	CONSTRUCTION	CLOSEOUT
MEP DESIGNER	HVAC DESIGN REPORT		
HERS RATER	DESIGN REVIEW CHECKLIST	FIELD RATER CHECKLIST	
FT AGENT/HVAC CONTRACTOR			FUNCTIONAL TESTING CHECKLIST
GENERAL CONTRACTOR		WATER MANAGEMENT REQUIREMENTS	

PERFORMANCE TESTING THRESHOLDS

Alongside prescriptive requirements, the IFA program requires performance testing to verify compliance and performance. Listed below are the required tests to be performed and their respective thresholds. Heartland Energy Consultant's project manager will advise and recommend appropriate measures for success; however, it is the responsibility of the contractor to ensure appropriate actions are taken to comply with test thresholds.

TEST	THRESHOLD
Compartmentalization (Blower Door)	≤ 0.30 CFM50/SF Enclosure Area
Total Duct Leakage	≤ 80 CFM25 OR 0.8 CFM25/CFA*
Ventilation	± 15 CFM OR 15% ASHRAE 62.2*
Bedroom Pressure Bypass	≤ ± 3 Pa

*Denotes that the greater value shall be used for compliance

CRITICAL NEXT STEPS

DESIGN TEAM REVIEW

It is highly recommended that the design team reviews this report and accompanying program documentation. We have found that the most successful projects begin with design teams that are fully immersed in the complexities of the program.

CONTRACTOR REVIEW

Like the design team review process, it is highly recommended that the construction team reviews this report and accompanying program documentation. Doing so prior to the commencement of construction gives the contractor an opportunity to plan and set sub-contractor expectations accordingly.

PRECONSTRUCTION MEETING

To ensure that projects progress smoothly Heartland Energy Consultants will conduct a preconstruction meeting with selected sub-contractors, the general contractor, and design team members. This provides the opportunity for all involved parties to review program requirements, and scopes of work and answer any relevant questions prior to the commencement of construction.

FOUNDATION INSPECTION

Following the installation of foundation insulation conduct an inspection to verify compliance with program requirements. This inspection is to be scheduled with a minimum of 7 day's notice. **No work shall be covered prior to the inspection taking place.**

CONSTRUCTION PREINSTALLATION MEETING

Approximately around the time of building dry-in and start of MEP rough-in in Heartland Energy Consultants will conduct a preinstallation meeting with energy affected trades and sub-contractors. This meeting is to review program requirements and answer any applicable questions.

PRE-DRYWALL INSPECTION

Following the installation of exterior wall insulation and building air sealing measures Heartland Energy Consultants will conduct a series of inspections to verify compliance with program requirements. These inspections are to be scheduled with a minimum of 7 days notice. **No work shall be covered prior to the inspection taking place.**

ROUGH-IN DUCT TESTING

To ensure success Heartland Energy Consultants will conduct sample duct testing following installation. The purpose of this inspection is to verify duct leakage thresholds and sealing measures prior to covering ductwork.

FINAL PERFORMANCE TESTING

Heartland Energy Consultants will conduct final performance testing and verification on the sample set of units and common spaces. Testing will take place around the substantial completion of the project and is to be scheduled with a minimum of 7 day's notice. For testing to occur all finishes must be complete, appliances installed, and all systems started and commissioned.

CONTACT INFORMATION

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ATTACHMENT LIST

Attachment A: Energy Star Checklists
Attachment B: Projected Worst-Case Reports

ATTACHMENT A: ENERGY STAR CHECKLISTS

ENERGY STAR Multifamily New Construction
National HVAC Design Report [1], Version 1.1 / 1.2 / 1.3 (Rev. 05)

HVAC Designer Responsibilities:

- Complete one National HVAC Design Report for each building which includes system design for all unique unit plans and common spaces. For projects with multiple buildings, one National HVAC Design Report per building or per project is permitted. [1]
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder, architect, or Rater. [2]
- Provide the completed National HVAC Design Report to the Rater and the person / company completing the National HVAC Functional Testing Checklist.

1. Design Overview

1.1 Designer name: Tim Tredway Designer company: LST CONSULTING ENGINEERS Date: 7/31/2025

1.2 Select which party you are providing these design services to: ☒ Builder / Developer ☐ FT Agent ☐ MEP / Credentialed HVAC contractor

1.3 Name of company you are providing these design services to (if different than Item 1.1): Overland Property Group

1.4 Building address: _____ City: Carter Lake State: IA Zip code: _____

2a. Dwelling Unit & Common Space Mechanical Ventilation Design ("Vent System") [3] & Inlets in Return Duct [4, 5, 6]						Designer Verified
Airflow:						
2.1 Dwelling unit ventilation airflow design rate & run-time meet the requirements of Section 4 of ASHRAE 62.2 [7] – 2013 Prescriptive Path Only: Rates shall not exceed 2013 rates by more than 50%. [8]						☒
2.2 Common space outdoor airflow design rate meet the requirements of Section 6 of ASHRAE 62.1 [9, 10] – 2013 ERI and Prescriptive Path Only: Rates shall not exceed 2013 rates by more than 50%. [11]						☒
2.3 Access points to measure airflow rate and inspect outdoor air dampers are provided and accessible by the Rater. [12]						☒
List unique unit plan for which 62.2 ventilation rates were calculated in the spaces to the right: [13]	1-Bed	2-Bed				
2.4 # of bedrooms:	1	2				
2.5 Square footage:	604	772				
2.6 Ventilation airflow rate required by ASHRAE 62.2:	33.2	45.7				
2.7 Ventilation airflow rate designed:	80	80				
2.7.1 If applicable, run-time per cycle (minutes):	34	46				
2.7.2 If applicable, cycle time (minutes):	26	35				
List common space for which 62.1 ventilation rates were calculated in the spaces to the right: [12, 13, 14]	Community Room	Office	1st Floor Corridors	2nd Floor Corridors	Fitness	Multipurpose Room
2.8 Ventilation airflow required by ASHRAE 62.1 (CFM): [10]	54	13	142	170	80	107
2.9 Ventilation airflow designed (CFM): [10]						
System Type & Controls:						
List Ventilation System ID in the spaces to the right: [13]	EF-1	EF-2				
2.10 Specified system type: (e.g., supply, exhaust, balanced, ERV, HRV)	Exhaust	Exhaust				
2.11 Manufacturer:	Panasonic	Panasonic				
2.12 Model Number:	FV-0511VQ1	FV-0511VQ1				
2.13 # installed in the building:	54	2				
2.14 Spaces each fan serves (i.e., single, multiple)	Single	Single				
2.15 Area / space(s) that system serves: (e.g., Unit A kitchens, corridor, community room)	Unit Bathroom	Restroom				
2.16 Specified control location: (e.g., Master bath, utility):	Bathroom	Restroom				
2.17 Specified controls allow the systems to operate automatically, without occupant intervention. A ventilation override control is specified and also labeled if its function is not obvious (e.g., a label is required for a toggle wall switch, but not for a switch that's on the ventilation equipment). The override control is not required to be readily accessible to the occupant. However, in such cases, the EPA recommends but does not require that the control be readily accessible to others (e.g., building maintenance staff) in lieu of the occupant.						☒
2.18 For any outdoor air inlet designed to connect to the dwelling unit HVAC system, specified controls automatically restrict airflow using a motorized damper during ventilation off-cycle and occupant override. [6, 15]						☐ ☒ N/A
Sound:						
2.19 If located in the dwelling unit, the fan of the specified system is rated ≤ 3 sones if intermittent and ≤ 2 sones if continuous, or exempted. [16]						☒ ☐ N/A
Efficiency:						
2.20 If dwelling-unit Vent System controller operates the dwelling unit HVAC fan, then HVAC fan operation is intermittent and either the fan type in Item 4.12 is ECM / ICM, or the controls will reduce the run-time by accounting for HVAC system is heating or cooling hours. [17]						☐ ☒ N/A
2.21 If in-unit bathroom fans or in-line fans are specified as part of the Dwelling Unit Mechanical Ventilation System, then they are ENERGY STAR certified. [18]						☒ ☐ N/A

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2.22 If central exhaust fans, ≤ 1 HP, are specified as part of the Dwelling Unit Mechanical Ventilation System, then they are direct-drive, ECM, with variable speed controllers. If > 1 HP, they are specified to meet or exceed efficiency standards for NEMA Premium™ Motors. [19]	☐	▣ N/A

Air Inlet Locations: (Complete this section if system has specified air inlet location(s); otherwise check "N/A".) [20]	**Designer Verified** ☐ N/A
2.23 Inlet(s) pull ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit.	▣
2.24 Inlet(s) are ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and ≥ 3 ft. from dryer exhausts and sources exiting the roof. [21]	▣
2.25 Inlet(s) are provided with rodent / insect screen with ≤ 0.5 in. mesh.	▣

2b. Dwelling Unit Local Mechanical Exhaust Design – System(s) are designed that mechanically exhaust air from each dwelling unit kitchen and bathroom directly to the outdoors or to ventilation risers and meet the continuous and/or intermittent rates. [22] ▣

Location		**Continuous Rate**	**Intermittent Rate** [23]	**Exhaust Fan Type**
Kitchen	Airflow	≥ 5 ACH, based on kitchen volume [24,25,26] (Alternative in Fn. 24)	≥ 100 CFM and, if not integrated with range, also ≥ 5 ACH based on kitchen volume [24, 25, 26, 27]	NOT REQUIRED FOR IFA COMPLIANCE
	Sound	Recommended if in-unit: ≤ 1 sone	Recommended if in-unit: ≤ 3 sones	
Bathroom	Airflow	≥ 20 CFM	≥ 50 CFM	☐ Continuous ▣ Intermittent ☐ In-unit fan ☐ Central / shared fan
	Sound	Required if in-unit: ≤ 2 sones	Recommended if in-unit: ≤ 3 sones	

2c. Common Space and Garage Minimum Exhaust Rates – System(s) are designed that mechanically exhaust air from each common space listed below, as required by ASHRAE 62.1-2010 (or later). ☐

Location	**ASHRAE 62.1 Rate**	**Design Rate**	**Location**	**ASHRAE 62.1 Rate**	**Design Rate**
Janitor Room	1 cfm/sq. ft.	50 CFM	Common space kitchen [28]	50 cfm / 100 cfm	N/A
Trash / Recycling Room	1 cfm/sq. ft.	N/A	Common space bathroom [29]	50 cfm per toilet / urinal	50 CFM
Parking Garage	0.05 cfm/sq. ft., standby 0.75 cfm/sq. ft., full-on	N/A	☐ Shared garage exhaust fan controls include CO and NO2 sensors.		

3. Heating & Cooling Loads

Dwelling Unit Heating & Cooling Loads (only required for ducted split AC, unitary AC, ASHP, WSHP, GSHP, and furnaces.) [30] ☐ N/A

3.1 Loads calculated using: ☐ Unabridged ACCA Manual J v8 ▣ 2013 / 2017 ASHRAE Fundamentals ☐ ASHRAE 183 ☐ Other per AHJ [31]

3.2 Check one box only to indicate whether the Dwelling Unit Loads is unit-specific or represents the design of more than one unit: [32]
☐ Unit-specific design ☐ Group design [33] ____ total groups for this building, representing ____ units.
▣ Worst-case design (If the top floor unit with the greatest CFA and window area results in total heat gain <18 kBtuh, it may represent all other units if cooling system selected for all is single-speed & <20 kBtuh or two-speed / variable-speed & <25 kBtuh.

3.3 Indoor design temperatures used in loads are 70°F for heating and 75°F for cooling. ▣

3.4 Outdoor design temperatures used in loads: (See Footnote 34 and www.energystar.gov/hvacdesigntemps.) [32]
County & State, or US Territory selected: Pottawattamie Co. Iowa Cooling season: 93 °F Heating season: -3 °F

List the unit plan for which Loads were calculated: [13]	2-Bed							
3.5 Location of Unit: top, mid, bottom, corner, interior	Top							
3.6 Number of occupants used in loads: [32, 35]	3							
3.7 Total occupant gains (Btuh): [32]	1200							
3.8 Conditioned floor area used in loads: [32, 36]	772							
3.9 Window area used in loads: [32, 37]	49.5							
3.10 Predominant window SHGC used in loads: [32, 38]	.53							
3.11 Infiltration (ACH / ACH50 / CFM) used in loads: [39]	0							
3.12 Mechanical ventilation (CFM) used in loads: [32]	46							
3.13 Non-occupant Internal gains (appliance, equipment and lighting) used in loads (Btuh): [32]	4175							
3.14 Door orientation (N, NE, E, SE, S, SW, W, NW): [33]	N							
3.15 Sensible Heat Gain At Design Conditions (kBtuh): [32]	9,246							
3.16 Latent Heat Gain At Design Conditions (kBtuh):	1,767							
3.17 Total Heat Gain at Design Conditions (kBtuh): [32]	11,013							
3.18 Total Heat Loss at Design Conditions (kBtuh):	7,462							

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3.19 Common Space Heating & Cooling Loads [13] (required for all common space heating and cooling systems)	**Designer Verified** ☐ N/A
Common Space Name: Community Room Ext Design Conditions: Total Heat Gain: 19,529 (kBtuh) Total Heat Loss: 20,745 (kBtuh)	
Common Space Name: 1st Floor Commons Design Conditions: Total Heat Gain: 18,613 (kBtuh) Total Heat Loss: 19,602 (kBtuh)	
Common Space Name: 2nd Floor Commons Design Conditions: Total Heat Gain: 10,321 (kBtuh) Total Heat Loss: 10,517 (kBtuh)	
3.20 Building Heating & Cooling Loads [13] (only required when shared systems such as central boilers or chillers are specified.) ☒ N/A	
System Name: _____ Design Conditions: Total Heat Gain: _____ (kBtuh) Total Heat Loss: _____ (kBtuh)	
System Name: _____ Design Conditions: Total Heat Gain: _____ (kBtuh) Total Heat Loss: _____ (kBtuh)	

4. Heating & Cooling Equipment Selection		
4.1 Equipment selected per ☐ ACCA Manual S, or where not applicable, ☒ Other: _____. (See Footnote 40)	☒	
4.2 Prescriptive Path: Equipment serving dwelling units, common spaces, and garages meet the efficiency levels specified in the ENERGY STAR Multifamily Reference Design. Electric resistance space heating is not specified in dwelling units. [41]	☒	☐ N/A
4.3 ERI Path: Equipment serving common spaces and garages but not serving dwelling units meet the efficiency levels specified in the ENERGY STAR Multifamily Reference Design. Also see the ENERGY STAR Multifamily Reference Design for restrictions on electric space resistance. [41]	☒	☐ N/A

Cooling Equipment [13] (Complete all applicable items, noting "N/A" as needed; where the same Equipment ID is used in multiple spaces (columns), identical data is not required to be repeated and can be left blank; where cooling is not provided, check "N/A".) ☐ N/A

List Cooling Equipment ID in the spaces to the right; duplicating as needed for each unique space served:	HP-1	HP-2	HP-1	HP-1	HP-1	HP-1	HP-2
4.4 Equipment type: (e.g., PTAC / AC, Chiller / CT, PTHP / WLHP / GSHP / ASHP / VRF)	ASHP	ASHP	ASHP	ASHP	ASHP	ASHP	ASHP
4.5 Area / Space(s) that system serves:	Units	Comm. Rm	1st Fl. Comm	2nd Fl. Comm	3rd Fl. Commo	Elevator Lobbi	Fitness/Multi-Pu
4.6 Chiller / condenser / outdoor unit manufacturer:	Trane	Trane					
4.7 Chiller / condenser / outdoor unit model #:	5TWR7024A1	5TWR7036					
4.8 Evaporator / indoor unit manufacturer:	TRANE	TRANE					
4.9 Evaporator / indoor unit model #:	5TEM6B02AV2	5TEM6B03					
4.10 AHRI reference #: [42]	216763464	216763778					
4.11 Rated efficiency:	17.1 SEER2	17.1 SEER					
4.12 Evaporator fan type: PSC, ECM / ICM, Other	ECM	ECM					
4.13 Compressor speed: Single, Two, Variable	VARIABLE	VARIABLE					
4.14 Turn down ratio (for variable speed equipment):	N/A	N/A					
4.15 Latent capacity at design conditions (kBtuh): [43]	2,600	5,300					
4.16 Sensible capacity at design conditions (kBtuh): [43]	18,900	24,400					
4.17 Total capacity at design conditions (kBtuh): [43]	21,500	29,700					
4.18 Cooling sizing % = Total capacity (Item 4.17) divided by Total Heat Gain of space(s) in Item 4.5: [30]	N/A	143%	110%	N/A	N/A	N/A	120%
4.19 Meets cooling sizing limit: (see below for A, B, C, D or N/A) [30, 32]	D	A	A	D	D	D	A
4.20 If "B", list Load sensible heat ratio = Max. sensible heat gain (Item 3.15) / Max. total heat gain (Item 3.17): [44]	N/A	N/A					
4.21 If "B", calculate HDD / CDD ratio: [44]	N/A	N/A					

Equipment Type & Climate Condition	**Compressor Type (Per Item 4.13)**		
	Single-Speed	Two-Speed	Variable-Speed
A: For Cooling-Only Equipment or For Cooling Mode of Heat Pump in Condition A Climate [44]	Recommended: 90 – 115% Allowed: 90 – 130%	Recommended: 90 – 120% Allowed: 90 – 140%	Recommended: 90 – 130% Allowed: 90 – 160%
B: For Cooling Mode of Heat Pump in Condition B Climate [44]	90% - 100%, plus 15 kBtuh	90% - 100%, plus 15 kBtuh	90% - 100%, plus 15 kBtuh
C: For low-load spaces (≤15 kBtuh) [45]	≤ 20 kBtuh		
D: For low-load spaces (≤18 kBtuh) [45]		≤ 25 kBtuh	≤ 25 kBtuh

Heating Equipment [13] (Complete all applicable items, noting "N/A" as needed; where the same Equipment ID is used in multiple spaces (columns), identical data is not required to be repeated and can be left blank; where heating is not provided, check "N/A".)							**Designer Verified** ☐ N/A
List Heating Equipment ID in the spaces to the right; duplicating as needed for each unique space served:	HP-1	HP-2	HP-1	HP-1	HP-1	HP-1	HP-2
4.22 Electric equipment type: PTHP, WLHP, GSHP, ASHP, VRF, Boiler, Furnace, Electric Resistance	ASHP	ASHP	ASHP	ASHP	ASHP	ASHP	ASHP
4.23 Gas Equipment type: HW PTAC / fan coil, Gas-Fired PTAC, Boiler, Furnace	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4.24 Area / Space(s) that system serves:	Units	Comm. Rm	1st Fl. Commor	2nd Fl. Commor	3rd Fl. Commons	Elevator Lobbies	Fitness/Multi-Purp
4.25 Manufacturer:	TRANE	TRANE					
4.26 Model Number:	5TWR7024A1	5TWR7036A1					
4.27 AHRI reference #: [42]	216763464	216763778					
4.28 Rated efficiency:	9.0 HSPF2	9.0 HSPF2					
4.29 Equipment output capacity (kBtuh): [46]	22,300	33,400					
4.30 Air-source heat pump output capacity (17°F) (kBtuh):	22,200	30,100					
4.31 Type of Venting: Natural Draft, Mechanically Drafted, Direct Vent [47]	N/A	N/A					
4.32 Furnace heating sizing % = Total capacity (Item 4.29) divided by Total Heat Loss of space(s) in Item 4.24: [30]	N/A	N/A					
4.33 Meets furnace sizing limit: (see below for A, B, C, or N/A) [30]	N/A	N/A					

A: For low-load spaces (≤ 10 kBtuh), furnace output capacity is ≤ 40 kBtuh

B: When Used for Heating Only	C: When Paired With Cooling
100 – 400%	Recommended: 100 – 140% Allowed: 100 – 400%

Equipment Controls	
4.34 All equipment controls below have been included where applicable in the HVAC Design.	☒
4.35 All heating and cooling systems serving a dwelling unit shall have thermostatic controls within the dwelling unit.	
4.35.1 Prescriptive Path: Dwelling unit thermostats are programmable.	
4.36 Where present in CZ 4-8, stair and elevator shaft vents shall be equipped with motorized dampers that are capable of being automatically closed during normal building operation and are interlocked to open as required by fire and smoke detection systems.	
4.37 Garage heating, plenum heating, and freeze protection systems shall include automatic controls capable of shutting systems off above 40°F space or pipe wall temperatures. Freeze protection systems include heat tracing of piping, even if self-regulating. Where heat tracing is specified for freeze protection, controls must be based on pipe wall temperature and a minimum of R-3 pipe insulation is also required.	
4.38 Snow- and ice-melting systems shall include automatic controls capable of shutting off the systems when the pavement temperature is above 50°F and no precipitation is falling, and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F so that the potential for snow or ice accumulation is negligible.	
Hydronic Distribution Requirements – Applies to heating or cooling systems serving more than one dwelling unit	☒ N/A
4.39 All hydronic distribution requirements below have been included where applicable in the HVAC Design.	☐
4.40 All terminal heating and cooling distribution equipment must be separated from the riser or distribution loop by a control valve or terminal distribution pump, so that heated or cooled fluid is not delivered to the dwelling unit distribution equipment when there is no call from the thermostat.	
4.41 Terminal units must be equipped with pressure independent balancing valves or pressure independent control valves.	
4.42 Piping of a heating or cooling system (e.g., steam, hot or chilled water, brine, refrigerant) shall be thermally insulated in accordance with ASHRAE 90.1-2007, Section 6.4.4.1.3. Construction documents must account for piping total thickness including required insulation when passing through planks or any other penetrations and shall specify that the piping must be inspected before access is covered up: [48] Heating System: Pipe size:____ in. Insulation thickness:___ in. Pipe size:____ in. Insulation thickness:___ in. Cooling System: Pipe size:____ in. Insulation thickness:___ in. Pipe size:____ in. Insulation thickness:___ in.	
4.43 For circulating pumps serving hydronic heating or cooling systems with three-phase motors, 1 horse-power or larger, motors shall meet or exceed efficiency standards for NEMA Premium™ motors. If 5 horse-power or larger, must also be specified with variable frequency drives.	
4.44 If a variable speed pumping system is installed, system designed to prevent "dead-heading" and a method of water flow bypass is provided, such as a minimum flow bypass valve or 3-way valves on specific terminal units.	
4.45 For shared boilers, chillers, and cooling towers, temperature and pressure gauges, air eliminator, expansion tank, and check valves are clearly shown on the drawings. A complete sequence of operations for all systems indicating recommendations for all setpoints is provided. For condensing boilers, design return temperature is indicated and system is designed to return water at a temperature that enables condensing.	

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5. Dwelling Unit Duct Design (Complete if heating or cooling equipment will be installed with ducts; otherwise check "N/A".)	**Designer Verified** ☐ N/A
5.1 Duct system designed for the equipment selected in Section 4, per ☐ ACCA Manual D ☒ Other: _____	☒

5.2 Room-by-room design airflows documented below (which must sum to the mode with the higher Design HVAC fan airflow). [13, 49, 50]

Name of the unit plan: 2-BED	Name of the unit plan:
Design HVAC fan airflow: [51] Cooling mode 800 CFM Heating mode 800 CFM	Design HVAC fan airflow: [51] Cooling mode _____ CFM Heating mode _____ CFM
Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode MEDIUM Heating mode MEDIUM	Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode _____ Heating mode _____
Design total external static pressure (corresponding to the mode with the higher airflow above): [53] .70 IWC	Design total external static pressure (corresponding to the mode with the higher airflow above): [53] _____ IWC

	Room Name	Design Airflow (CFM)		Room Name	Design Airflow (CFM)
1		155	1		
2		240	2		
3	BEDROOM 1	135	3		
4	BEDROOM 2	135	4		
5		35	5		
6			6		
7			7		
8			8		
9			9		
10			10		
	Total for all rooms	700		Total for all rooms	0

6. Duct Quality Installation – *Applies to Heating, Cooling, Ventilation, Exhaust, & Pressure Balancing Ducts, Unless Noted in Footnote*	
6.1 Applicable duct quality installation requirements in 6.2 – 6.8 below have been included in the HVAC Design.	☒
6.2 Ductwork specified without kinks, sharp bends, compressions, or excessive coiled flexible ductwork. [54]	
6.3 All supply and return ducts not in conditioned space, including connections to trunk ducts, are insulated to ≥ R-6. [55]	
6.3.1 Prescriptive Path: Dwelling unit ductwork and air handlers are specified to be within conditioned space.	
Dwelling Unit	
6.4 MERV 6+ filter(s) specified for each ducted mechanical System serving an individual dwelling unit, designed so all return and mechanically supplied outdoor air passes through filter(s) prior to conditioning, and located to facilitate access & regular service by the occupant, building owner, or building maintenance staff. Filter access panel specified with a gasket or comparable sealing mechanism.	
6.5 Ductwork air-sealing specified such that Rater-measured total duct leakage is ≤ 4 CFM25 per 100 sq. ft. of CFA at rough-in or ≤ 8 CFM25 per 100 sq. ft. at final, or if there are no ducted returns, ≤ 3 CFM25 per 100 sq. ft. of CFA at rough-in or ≤ 6 CFM25 per 100 sq. ft at final. [56, 57]	
6.6 All bedrooms provided with transfer grilles, jump ducts, dedicated return ducts, and/or undercut doors. Bedrooms with a design supply airflow ≥ 150 CFM (as reported in Item 5.2) are specified to achieve a Rater-measured pressure differential ≥ - 5 Pa and ≤ 5 Pa with respect to the main body of the dwelling unit when all air handlers are operating.	
Common Space and Central Exhaust	
6.7 Duct design specifies that all supply, return, and exhaust ductwork and all plenums serving common spaces shall be sealed at all transverse joints, longitudinal seams, and duct wall penetrations.	
6.8 Central exhaust systems (that serve four or more dwelling units): Ductwork air-sealing specified such that measured duct leakage does not exceed 25% of exhaust fan flow at rough-in (e.g., all ductwork from the exhaust fan) or 30% of exhaust fan flow at final (e.g., inclusive of all ductwork between the fan and the grilles). [58]	

Footnotes:

1. This report shall represent system design for all unique unit plans, common spaces, and where applicable, parking garages. The term 'common space' refers to any spaces in the building being certified that serve a function in support of the residential part of the building that is not part of a dwelling or sleeping unit. This includes spaces used by residents, such as corridors, stairs, lobbies, laundry rooms, exercise rooms, residential recreation rooms, and dining halls, as well as offices and other spaces used by building management, administration or maintenance in support of the residents. For the purpose of completing this report, for buildings being certified using the ASHRAE Path, the term 'common space' also includes commercial spaces where they are included in the energy model and savings contribute to achieving the Performance Target. As an alternative, for dwelling units, designers may instead choose to complete a Single-Family New Homes National HVAC Design Report for each unique unit plan, if room-by-room loads are calculated using Unabridged ACCA Manual J v8. Sections 4 and 5 must be completed in either Design Report unless exempted by this Report. All other systems, including all systems serving common spaces, must be documented in this Design Report. This report is designed to meet ASHRAE 62.1-2010 or later, ASHRAE 62.2-2010 or later, and ANSI / ACCA's 5 QI-2015 protocol, thereby improving the performance of HVAC equipment in new multifamily buildings when compared to multifamily buildings 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 or occupant behavior). Therefore, system designs documented through the use of this report are not a guarantee of proper ventilation, indoor air quality, or HVAC performance.
2. The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater, Approved Inspector, as defined by ANSI / RESNET / IECC 301, or an equivalent designation as determined by a Home Certification Organization (HCO) or Multifamily Review Organization (MRO); and, b) have attended and successfully completed an EPA-recognized training class. See www.energystar.gov/mftraining.
3. As defined by ANSI / RESNET / ICC 301-2019, a Dwelling Unit Mechanical Ventilation System is a ventilation system consisting of powered ventilation equipment such as motor-driven fans and blowers and related mechanical components such as ducts, inlets, dampers, filters and associated control devices that provides dwelling-unit ventilation at a known or measured airflow rate.
4. The dwelling-unit mechanical ventilation system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of a dwelling-unit mechanical ventilation system. Designers may provide supplemental documentation as needed to document the system design. For example, for Item 2.7, designers are permitted to provide multiple combinations of a design ventilation airflow rate, run-time per cycle, and cycle time. When multiple combinations are provided, the Rater will be required to first assess the run-time setting of the installed system and use that to determine the corresponding design ventilation rate. The Rater-measured ventilation rate then must fall within the program-specified tolerance relative to that design ventilation rate.
5. In "Warm-Humid" climates as defined by 2009 IECC Figure 301.1 (i.e., CZ 1 and portions of CZ 2 and 3A below the white line), it is recommended, but not required, that equipment be specified with sufficient latent capacity to maintain indoor relative humidity at ≤ 60%.
6. Item 2.18 applies to any outdoor air inlet connected to the dwelling unit HVAC system, regardless of its intended purpose (e.g., for ventilation air, make-up air, combustion air). For example, if an outdoor air inlet connected to a ducted return is used as a dedicated source of outdoor air for an exhaust ventilation system (e.g., bath fan), the outdoor airflow must be automatically restricted when the exhaust fan is not running and in the event of an override of the exhaust ventilation system.

   Automatic restriction of airflow is exempted if a manual shutoff damper is used with a continuous exhaust ventilation system and is readily-accessible, labeled as the override, and not used as a balancing damper.

   Note that a Rater will generally measure the ventilation rate at the highest HVAC fan speed applicable to ventilation mode (e.g., if the inlet only opens when the HVAC is in 'fan-only' mode, then test in this mode) to verify that it is ≤ 15 CFM or 15% above design value. If the inlet has a motorized damper that only opens when the local mechanical kitchen exhaust is turned on, then testing is not required. As an alternative, measurement of the outdoor airflow can be waived if a Constant Airflow Regulating (CAR) damper with a manufacturer-specified maximum flow rate no higher than 15 CFM or 15% above the ventilation design value is installed on the inlet.
7. Airflow design rates and run-times shall be determined using ASHRAE 62.2-2010 or later. Designers are permitted, but not required, to use published addenda and/or more recent editions of the standard to assess compliance. The year of the standard that is used shall be listed in the space provided. For dwelling units, the minimum ventilation rate required by ASHRAE 62.2 can be calculated using either Equation 4.1a or Table 4.1a. For sleeping units, the following equation must be used to determine minimum airflow rates: 0.01 x Conditioned Floor Area + 7.5 x (number of beds).
8. Where the Exhaust Fan Type in Section 2b indicates "Continuous" for both Bathroom and Kitchen, the Rater may use this equation to determine the maximum ventilation rate allowed: 30 CFM x number of bathrooms + 75 CFM.
9. Airflow design rates shall be determined using ASHRAE 62.1-2010 or later. Designers are permitted, but not required, to use published addenda and/or more recent editions of the standard to assess compliance. The year of the standard that is used shall be listed in the space provided.
10. The following spaces require outdoor air ventilation: corridors, offices, break rooms, gyms, fitness centers, exercise rooms, lobbies, community rooms, meeting rooms, multi-purpose rooms, lounges, laundry rooms, swimming pools, daycares, classrooms, shared or commercial kitchens, shared dining rooms, and computer rooms.
11. When calculating whether common space ventilation rates exceed ASHRAE 62.1-2013 rates by more than 50%, the calculation should use the minimum rates listed in Section 6 of the Standard by space, but it is permitted to combine the total ventilation provided to all common space areas when determining whether ventilation exceeds the 50%.
12. For permits on or before 01/01/2024, where outdoor air is supplied to a common space via a PTAC or PTHP, in lieu of measurement, the design CFM shall meet or exceed the ventilation rates required by ASHRAE 62.1-2010 and the space served by the PTAC or PTHP shall have at least one operable window. For permits after 01/01/2024, both the runtime and measurement of outdoor air through these systems will be required to demonstrate compliance with ASHRAE 62.1-2010 or alternative ventilation system specified (e.g., ducted supply).
13. If the tables provided cannot accommodate all the unit plans, spaces, or systems in the building, use the tables in Appendix A to supplement the Design Report.
14. List each individual common space separate from other spaces, such that when reporting airflow for Items 2.8 and 2.9, compliance for each space can be demonstrated. For example, list an office space separate from a community room, even if these spaces are served by the same system and even if the outdoor air rates required are the same. Similarly, where a space is repeated in the building, such as a corridor, report

each space by floor (e.g., FL1 Corridor, FL2 Corridor). Rather than list these values in this report, as an alternative, the HVAC Designer is permitted to submit the values in a separate document or file. Where the building has total corridor space ≤ 250 sq. ft. and does not contain any of the other common spaces which require outdoor air per Item 2.2, outdoor air is not required to be provided to the corridor and "N/A" may be entered for Item 2.9.

15. In addition, consult manufacturer requirements to ensure return air temperature requirements are met.
16. Dwelling-unit mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.7. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated ≥ 400 CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be ≥ 4 ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.
17. Note that the 'fan-on' setting of a thermostat would not be an acceptable controller because it would continuously operate the HVAC fan.
18. Bathroom fans with a rated flow rate ≥ 500 CFM and heat/energy recovery ventilation fans are exempted from the requirement to be ENERGY STAR certified.
19. As an alternative to meeting or exceeding the efficiency standards for NEMA Premium motors, documentation that an exhaust fan motor has a fan energy index (FEI) ≥ 1.2 at the design point of operation OR a fan efficacy ≥ 1.1 CFM/Watt is permitted.
20. Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, the EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the building maintenance staff.
21. Two alternatives to the required 10 ft. distance are provided: 1) inlets providing outdoor air to a dwelling unit are permitted to be ≥ 5 ft. of stretched-string distance from outlets of both exhaust dwelling-unit mechanical ventilation systems and local mechanical exhaust systems, and 2) the outlet and inlet of ERV's and HRV's may use a smaller distance if allowed by the manufacturer of the system. If the second alternative is used, the manufacturer's instructions shall be collected for documentation purposes.
22. Continuous bathroom local mechanical exhaust fans shall be rated for sound at no less than the design airflow rate. Intermittent bathroom and both intermittent and continuous kitchen local mechanical exhaust fans are recommended, but not required, to be rated for sound at no less than the design airflow rate. Per ASHRAE 62.2-2010, an exhaust system is one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope (e.g., bath exhaust fans, range hoods, clothes dryers). Per ASHRAE 62.2-2010, a bathroom is any room containing a bathtub, shower, spa, or similar source of moisture.
23. An intermittent mechanical exhaust system, where provided, shall be designed to operate as needed by the occupant. Control devices shall not impede occupant control in intermittent systems.
24. Where 5 ACH is selected, kitchen volume shall be determined by drawing the smallest possible rectangle on the floor plan that encompasses all cabinets, pantries, islands, peninsulas, ranges / ovens, and the kitchen exhaust fan, and multiplying by the average ceiling height for this area. In addition, the continuous kitchen exhaust rate shall be ≥ 25 CFM, per 2009 IRC Table M1507.3, regardless of the rate calculated using the kitchen volume. Cabinet volume shall be included in the kitchen volume. As an alternative to 5 ACH for Dwelling Units and Sleeping Units, 50 CFM of continuous exhaust is permitted to be used, regardless of kitchen volume. In such cases, the edge of the exhaust fan or intake grille shall be located within 10 ft. of the edge of the range, as measured horizontally on the floor plan.
25. While not required, the prescriptive duct sizing requirements in Table 5.3 of ASHRAE 62.2-2010 are recommended to be used for kitchen exhaust fans based upon the rated airflow of the fan at 0.25 IWC.
26. As an alternative, dwelling units are permitted to use a continuous kitchen exhaust rate of 25 CFM per 2009 IRC Table M1507.3, if they are either a) PHIUS+ or PHI certified, or b) provide both dwelling unit ventilation and local mechanical kitchen exhaust using a balanced system, and have a Rater-verified whole-building infiltration rate ≤ 1.0 ACH50 or ≤ 0.05 CFM50 per sq. ft. of Enclosure Area. 'Enclosure Area' is defined as the area of the surfaces that bound the volume being pressurized / depressurized during the test.
27. All intermittent kitchen exhaust fans must be capable of exhausting at least 100 CFM. In addition, if the fan is not part of a vented range hood or appliance-range hood combination (i.e., if the fan is not integrated with the range), then it must also be capable of exhausting ≥ 5 ACH, based on the kitchen volume.
28. For continuous system operation, the lower rate may be used. Otherwise, use the higher rate. Commercial kitchens shall be designed to provide a minimum continuous rate of 0.70 cfm/sq. ft.
29. As an alternative, for a toilet room intended to be occupied by one person at a time, a minimum continuous rate of 25 cfm is permitted.
30. This section / item applies to split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65 kBtuh with forced-air distribution systems and to furnaces up to 225 kBtuh with forced-air distribution system serving individual dwelling units. Forced-air distribution systems are those that supply air through ductwork exceeding 0 ft. in length. For VRF air conditioners or heat pumps, the capacity of the system is the rated cooling capacity of the outdoor unit. This section / item is recommended, but not required for non-ducted systems, such as non-ducted mini-splits, multi-splits, PTHP's, or PTAC's.
31. Select "2013 / 2017 ASHRAE Fundamentals" if using Chapter 17 of the 2013 or 2017 ASHRAE Handbook of Fundamentals. Select "Other per AHJ" if the Authority Having Jurisdiction where the unit will be certified mandates the use of a load calculation methodology other than Unabridged ACCA Manual J v8 or 2013 or 2017 ASHRAE Handbook of Fundamentals.
32. Check the box for "unit-specific design" if the design was created for the specific plan configuration (i.e., elevation, option, orientation, and county) of the unit to be certified. Check the box for "group design" if designs were created for unit plans that are repeated throughout the building with potentially different configurations (i.e., different elevations and/or orientations). Check the box for "worst-case design" if loads for the unit with the largest heat gain in the building are less than 18 kBtuh and are being used to represent all other units. Only one box may be checked. Regardless of the box checked, the system design as documented on this HVAC Design Report must fall within the following tolerances for the unit to be certified:
    - Item 3.4: The outdoor design temperature used in loads are within the limits defined at www.energystar.gov/hvacdesigntemps.
    - Item 3.6: The number of occupants used in loads is within ± 2 of the dwelling unit to be certified.

- Item 3.7: Total occupant gains used in loads shall not exceed 645 Btuh per occupant.
- Item 3.8: The conditioned floor area used in loads is between 100 sq. ft. smaller and 300 sq. ft. larger than the dwelling unit to be certified.
- Item 3.9: The window area used in loads is between 15 sq. ft. smaller and 60 sq. ft. larger than the dwelling unit to be certified, or for dwelling units with > 500 sq. ft. of window area, between 3% smaller and 12% larger.
- Item 3.10: The predominant window SHGC is within 0.1 of the predominant value in the dwelling unit to be certified.
- Item 3.12: The mechanical ventilation rate used in loads is the same as the value in Section 2a for the given unit plan.
- Item 3.13: The sum of the internal gains associated with lighting and appliances used in loads shall not exceed 3,600 Btuh.
- Items 3.15 & 3.17: The sensible & total heat gain are documented for the configuration of the dwelling unit to be certified.
- Item 4.19: The cooling sizing % is within the cooling sizing limit selected.

Provide the National HVAC Design Report to the party you are providing these design services to (i.e., a builder / developer, Functional Testing Agent (FT Agent), and/or MEP / credentialed HVAC contractor) and to the Rater. The report is only required to be provided once per project / building. As long as a report has been provided that falls within these tolerances for the units to be certified, no additional work is required. However, if no report falls within these tolerances or if any aspect of the system design changes, then an additional report will need to be generated prior to certification. Buildings certified under Rev. 04 of the program requirements are permitted to use any Revision of the MFNC National HVAC Design Report.
Visit www.energystar.gov/hvacdesigntools for a tool to assist with group designs and for more information.

33. For each unique unit floorplan, document the loads for the configuration (e.g., level, orientation) that the dwelling unit might be built in. For example, if a unit plan will only be built in a specific level and orientation (e.g., top-floor, facing South), then the designer only needs to document the loads for this one configuration. To determine whether a unit floorplan is “unique”, the guidance in ANSI 301-2019, Section 5.1.4.4.1 may be followed. Orientation represents the direction that the front door of the dwelling unit is facing. In Section 4, to calculate Cooling sizing % for each configuration of each unique floorplan, the same system may need to be duplicated in multiple columns.
34. Visit www.energystar.gov/hvacdesigntemps for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR. For “County & State, or US Territory, selected”, select the County and State or US Territory (i.e., Guam, Northern Mariana Islands, Puerto Rico, or US Virgin Islands), where the unit is to be certified. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93°F, then the same report could be used in Fairfax County (which has a higher limit of 94°F) but not in Arlington County (which has a lower limit of 92°F). If a jurisdiction-specified design temperature is used that exceeds the limit in the ENERGY STAR Single-Family New Homes Design Temperature Limit Reference Guide, designers must submit a Design Temperature Exception Request. Visit www.energystar.gov/hvacdesigntemps for a copy of this form.
35. To determine the number of occupants among all HVAC systems in the dwelling unit, calculate the number of bedrooms, as defined below, and add one. This number of occupants must be within ± 2 of the dwelling unit to be certified.

    A bedroom is defined by ANSI / RESNET / ICC 301-2014 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 in. above the floor; AND
    - have a minimum net clear opening of 5.7sq. 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.
36. The difference between the Conditioned Floor Area (CFA) used in the design and the actual dwelling unit to be certified must fall within the tolerance specified in Footnote 32, as verified by a Rater. Be advised, the Rater will calculate CFA using the definition in ANSI / RESNET / ICC 301-2019, which defines this value, in part, as the floor area of the Conditioned Space Volume within a building or Dwelling Unit, not including the floor area of attics, crawlspaces, and basements below air sealed and insulated floors. See https://codes.iccsafe.org/content/RESNET3012019P1/3-definitions- for the complete definition.
37. The difference between the window area used in the design and the actual dwelling unit to be certified must fall within the tolerance specified in Footnote 32, as verified by a Rater. Be advised, the Rater will calculate window area using the on-site inspection protocol provided in Normative Appendix B of ANSI / RESNET / ICC 301-2019, which instructs the Rater to measure the width and height of the rough opening for the window and round to the nearest in., and then to use these measurements to calculate window area, rounding to the nearest tenth of a sq.. See https://codes.iccsafe.org/content/RESNET3012019P1/normative-appendix-b-inspection-procedures-for-minimum-rated-features for the complete protocol.
38. “Predominant” is defined as the SHGC value used in the greatest amount of window area in the dwelling unit.
39. Infiltration rate shall use “Tight” values for the cooling season infiltration rate and “Tight” values for the heating season infiltration rate, as defined by Table 5A or 5B of ACCA Manual J, Eighth Edition, Version Two. Alternatively, infiltration rate shall not exceed 0.24 air changes per hour.
40. Equipment shall be selected using the maximum total heat gain and the total heat loss in Section 3 per ACCA Manual S, Second Edition, except that cooling ranges above ACCA Manual S limits are temporarily allowed, per Item 4.19, and heating ranges above ACCA Manual S limits are allowed where heating and hot water are provided by the same equipment or where standby equipment is needed for redundancy, but only operate when the primary equipment is not operating. For equipment outside the scope of ACCA Manual S, “Other” may be indicated and the equipment sizing approach listed in the space provided.

41. Electric resistance limitations do not apply to heat pumps with integral supplemental or emergency electric resistance heating. The EPA recommends but does not require that heat pumps have controls to limit the use of emergency or supplemental heat to heat pump failures or when the heat pump cannot meet the heating load. The EPA also recommends but does not require that heat pumps in CZ 5-8 are ENERGY STAR certified cold-climate heat pumps. Electric resistance limitations do not apply to systems dedicated to heating outdoor air supplied by a mechanical ventilation system, as long as the space served is primarily heated by a non-electric-resistance system that meets the efficiency requirements noted in the ENERGY STAR Multifamily Reference Design. Electric resistance limitations apply to garages, but do not apply to heated plenums meeting Item 4.37, or stairwells where automatic thermostatic controls prevent operation above 50ºF.
42. If the equipment contains multiple components, the AHRI Reference # shall represent the rated efficiency of the specific combination of indoor and outdoor components. The EPA recommends, but does not require, that the rating also encompass the furnace when such a rating is available. If an AHRI Reference # is not available, OEM-provided documentation shall be attached with the rated efficiency. For residential split air conditioners and heat pumps, the rated efficiency shall be for the specific combination of indoor and outdoor components of the air conditioner or heat pump, along with confirmation that the two components are designed to be used together. If the AHRI Reference # is reported in Item 4.10 (e.g., heat pumps), the AHRI Reference # does not need to be listed again in Item 4.27.
43. The full system capacity at design conditions, from OEM expanded performance data, shall be listed and shall include the capacity of all systems providing space cooling to the dwelling unit. For two-speed or variable-speed equipment, the full system capacity shall reflect the capacity at the maximum available compressor speed or when the compressor operates at the AHRI rating test speed, respectively.
44. Per ACCA Manual S, Second Edition, if the load sensible heat ratio is ≥ 95% and the HDD / CDD ratio is ≥ 2.0, then the Climate is Condition B, otherwise it is Condition A.
45. As an alternative for low-load dwelling units, a system match-up including a single-speed compressor with a total capacity ≤ 20 kBtuh is permitted to be used in spaces with a total cooling load ≤ 15 kBtuh. A system match-up including a two-speed or variable-speed compressor with a total capacity ≤ 25 kBtuh is permitted to be used in spaces with a total cooling load ≤ 18 kBtuh.
46. The full system capacity shall be listed for the heating system. For two-stage and modulating furnaces, the full system capacity shall reflect the maximum output available. For shared boilers, the full system capacity may exclude standby equipment needed for redundancy.
47. Per the 2009 International Mechanical Code, a direct-vent furnace or boiler is one that is constructed and installed so that all air for combustion is derived from the outdoor atmosphere and all flue gases are discharged to the outside atmosphere; a mechanical draft system is a venting system designed to remove flue or vent gases by mechanical means consisting of an induced draft portion under non-positive static pressure or a forced draft portion under positive static pressure; and a natural draft system is a venting system designed to remove flue or vent gases under non-positive static vent pressure entirely by natural draft. Naturally drafted equipment is only allowed if located in a space outside the pressure boundary, where the envelope assemblies separating it from conditioned space are insulated and air-sealed. For mechanically drafted boilers, make-up air sources must be mechanically closed when the boiler is not in operation.
48. Item 4.42 does not apply to factory-installed piping within HVAC equipment or piping that conveys fluids having a design operating temperature range between 60°F and 105°F, inclusive.
49. Designers may provide supplemental documentation with room-by-room and total design airflows in lieu of completing Item 5.2. Sample supplemental documentation can be found at www.energystar.gov/hvacdesigntools.
50. Orientation-specific room-by-room design airflows are recommended, but not required, to distribute airflow proportional to load, thereby improving comfort and efficiency. While air-balancing of supply registers and return grilles is not required to be completed as part of HVAC Functional Testing, it is recommended that ducted HVAC systems be designed such that they can be balanced in the field (i.e., provide proper access to any and all balancing dampers, provide ducting and grille layouts such that accurate air measurements can be taken).
51. Design HVAC fan airflow is the design airflow for the blower in CFM, as determined using the manufacturer's expanded performance data. The Functional Testing Agent is required to measure the HVAC fan airflow using the mode with the higher airflow, within ± 15% of design.
52. Design HVAC fan speed setting is the fan speed setting on the control board (e.g., low, medium, high) that corresponds with the Design HVAC fan airflow.
53. Design total external static pressure is the pressure corresponding to the Design HVAC fan airflow, inclusive of external components (e.g., evaporator coil, whole-house humidifier, or ≥ MERV 6 filter).
54. Kinks are to be avoided and are caused when ducts are bent across sharp corners such as framing members. Sharp bends are to be avoided and occur when the radius of the turn in the duct is less than one duct diameter. Compression is to be avoided and occurs when flexible ducts in unconditioned space are installed in cavities smaller than the outer duct diameter and ducts in conditioned space are installed in cavities smaller than inner duct diameter. Ducts shall not include coils or loops except to the extent needed for acoustical control.
55. Item 6.3 does not apply to ducts that are a part of local mechanical exhaust or exhaust-only dwelling-unit ventilation systems. The EPA recommends, but does not require, that all metal ductwork not encompassed by Section 6 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation.
56. Item 6.5 generally applies to the ducts of space heating, space cooling, and Dwelling Unit Mechanical Ventilation Systems. However, visual inspection is permitted in lieu of testing for the following system types: 1) a Dwelling Unit Mechanical Ventilation System not connected to the space heating or space cooling system, regardless of the number of dwelling units it serves; 2) a space heating or space cooling system for which the ducts and air handler are in conditioned space and the total supply duct length of the system, including all supply trunks and branches, is ≤ 10 ft.; and 3) a space heating or space cooling system that serves more than one dwelling unit. In such cases, a Rater shall visually verify that all seams and connections are sealed with mastic or metal tape and all duct boots are sealed to floor, wall, or ceiling using caulk, foam, or mastic tape.
57. Duct leakage shall be determined and documented by a Rater in accordance with ANSI / RESNET / ICC 380. Leakage limits shall be assessed on a per-system, rather than per-dwelling unit, basis. For a duct system with one or two returns, the total Rater-measured duct leakage is permitted to be the greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM25 at 'rough-in' or the greater of ≤ 8 CFM25 per 100 sq. ft. of CFA or ≤ 8 CFM25 at 'final'. For a duct system with three or more returns, the total Rater-measured duct leakage is permitted to be the greater of ≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM25 at 'rough-in' or the greater of ≤ 12 CFM25 per 100 sq. ft. of CFA or ≤ 120 CFM25 at 'final'. For a duct system without any ducted returns, the total Rater-measured duct leakage is permitted to be the greater of ≤ 3 CFM25 per 100 sq. ft. of CFA or ≤ 30 CFM25 at 'rough-in' or the greater of ≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM25 at 'final' and, the Rater-measured pressure

difference between the space containing the air handler and the conditioned space, with the air handler running at high speed, is ≤ 5 Pa. For systems > 1 ton, increase by 1 Pa per half ton.

58. This test is not required of central exhaust systems serving clothes dryers but is required for the central exhaust portion of balanced systems such as HRVs and ERVs.

ENERGY STAR Multifamily New Construction
National HVAC Design Report [1], Version 1.1 / 1.2 / 1.3 (Rev. 05)

Appendix A – Supplementary tables for Section 2 and 3

2a. Dwelling Unit & Common Space Mechanical Ventilation Design [4, 5]						
List unique unit plan for which 62.2 ventilation rates were calculated in the spaces to the right:						
2.4 # of bedrooms:						
2.5 Square footage:						
2.6 Ventilation airflow rate required by ASHRAE 62.2:						
2.7 Ventilation airflow rate designed:						
2.7.1 If applicable, run-time per cycle (minutes):						
2.7.2 If applicable, cycle time (minutes):						

List common space for which 62.1 ventilation rates were calculated in the spaces to the right:						
2.8 Ventilation airflow rate required by ASHRAE 62.1:						
2.9 Ventilation airflow rate designed:						

System Type & Controls:						
List Ventilation System ID in the spaces to the right:						
2.10 Specified system type: (e.g., supply, exhaust, balanced, ERV, HRV)						
2.11 Manufacturer:						
2.12 Model Number:						
2.13 # installed in the building:						
2.14 Spaces each fan serves (i.e., single, multiple)						
2.15 Area / space(s) that system serves: (e.g., Unit A kitchens, corridor, community room)						
2.16 Specified control location: (e.g., Master bath, utility):						

3. Heating & Cooling Loads								
Dwelling Unit Heating & Cooling Loads (only required for ducted split AC, unitary AC, ASHP, WSHP, GSHP, and furnaces) [29] ☐ N/A								
List the unit plan for which Loads were calculated:								
3.5 Location of Unit: top, mid, bottom, corner, interior								
3.6 Number of occupants used in loads: [32, 35]								
3.7 Total occupant gains (Btuh): [32]								
3.8 Conditioned floor area used in loads: [32, 36]								
3.9 Window area used in loads: [32, 37]								
3.10 Predominant window SHGC used in loads: [32, 38]								
3.11 Infiltration (ACH / ACH50) used in loads: [39]								
3.12 Mechanical ventilation (CFM) used in loads:								
3.13 Non-occupant Internal gains (appliance, equipment and lighting) used in loads (Btuh): [32]								
3.14 Door orientation (N, NE, E, SE, S, SW, W, NW): [33]								
3.15 Sensible Heat Gain At Design Conditions (kBtuh): [32]								
3.16 Latent Heat Gain At Design Conditions (kBtuh):								
3.17 Total Heat Gain at Design Conditions (kBtuh): [32]								
3.18 Total Heat Loss at Design Conditions (kBtuh):								

Appendix A – Supplementary tables for Section 3

3.19 Common Space Heating & Cooling Loads (required for all common space heating and cooling systems)		
Common Space Name: 3rd Floor Common	Design Conditions: Total Heat Gain: 12,213 (kBtuh)	Total Heat Loss: 14,175 (kBtuh)
Common Space Name: 1st-3rd Elevator Lobbi	Design Conditions: Total Heat Gain: 11,484 (kBtuh)	Total Heat Loss: 14,724 (kBtuh)
Common Space Name: Fitness/Multi-Purpose	Design Conditions: Total Heat Gain: 24,824 (kBtuh)	Total Heat Loss: 17,679 (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
Common Space Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)

3.20 Building Heating & Cooling Loads (only required when shared systems such as central boilers or chillers are specified)		
System Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
System Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
System Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)
System Name: ______	Design Conditions: Total Heat Gain: ______ (kBtuh)	Total Heat Loss: ______ (kBtuh)

Appendix A – Supplementary tables for Section 4

4. Heating & Cooling Equipment Selection							
Cooling Equipment (Complete all applicable items, noting "N/A" as needed; where the same Equipment ID is used in multiple spaces (columns), identical data is not required to be repeated and can be left blank; where cooling is not provided, check "N/A".) ☐ N/A							
List Cooling Equipment ID in the spaces to the right; duplicating as needed for each unique space served:							
4.4 Equipment type: (PTAC / AC, Chiller / CT, PTHP / WLHP / GSHP / ASHP / VRF)							
4.5 Area / Space(s) that system serves:							
4.6 Chiller / condenser / outdoor unit manufacturer:							
4.7 Chiller / condenser / outdoor unit model #:							
4.8 Evaporator / indoor unit manufacturer:							
4.9 Evaporator / indoor unit model #:							
4.10 AHRI reference #: [42]							
4.11 Rated efficiency:							
4.12 Evaporator fan type: PSC, ECM / ICM Other:							
4.13 Compressor speed: Single, Two, Variable							
4.14 Turn down ratio (for variable speed equipment):							
4.15 Latent capacity at design conditions (kBtuh): [43]							
4.16 Sensible capacity at design conditions (kBtuh): [43]							
4.17 Total capacity at design conditions (kBtuh): [43]							
4.18 Cooling sizing % = Total capacity (Item 4.17) divided by Total Heat Gain of space(s) in Item 4.5:							
4.19 Meets cooling sizing limit: (A, B, C, D or N/A) [30, 32]							
4.20 If "B", list Load sensible heat ratio = Max. sensible heat gain (Item 3.15) / Max. total heat gain (Item 3.17): [40]							
4.21 If "B", calculate HDD / CDD ratio: [44]							

	Compressor Type (Per Item 4.13)		
Equipment Type & Climate Condition	Single-Speed	Two-Speed	Variable-Speed
A: For Cooling-Only Equipment or For Cooling Mode of Heat Pump in Condition A Climate [44]	Recommended: 90 – 115% Allowed: 90 – 130%	Recommended: 90 – 120% Allowed: 90 – 140%	Recommended: 90 – 130% Allowed: 90 – 160%
B: For Cooling Mode of Heat Pump in Condition B Climate [44]	90% - 100%, plus 15 kBtuh	90% - 100%, plus 15 kBtuh	90% - 100%, plus 15 kBtuh
C: For low-load spaces (≤15 kBtuh) [45]	≤ 20 kBtuh		
D: For low-load spaces (≤18 kBtuh) [45]		≤ 25 kBtuh	≤ 25 kBtuh

Heating Equipment (Complete all applicable items, noting "N/A" as needed; where the same Equipment ID is used in multiple spaces (columns), identical data is not required to be repeated and can be left blank; where heating is not provided, check "N/A".) ☐ N/A							
List Heating Equipment ID in the spaces to the right; duplicating as needed for each unique space served:							
4.22 Electric equipment type: PTHP, WLHP, GSHP, ASHP, VRF, Boiler, Furnace, Electric Resistance							
4.23 Gas Equipment type: HW PTAC / fan coil, Gas-Fired PTAC, Boiler, Furnace							
4.24 Area / Space(s) that system serves:							
4.25 Manufacturer:							
4.26 Model Number:							
4.27 AHRI reference #: [42]							
4.28 Rated efficiency:							
4.29 Equipment output capacity (kBtuh):							
4.30 Air-source heat pump output capacity (kBtuh) (17°F):							
4.31 Type of Venting: Natural Draft, Mechanically Drafted, Direct Vent [47]							

4.32 Furnace heating sizing % = Total capacity (Item 4.29) divided by Total Heat Loss of space(s) in Item 4.24:							
4.33 Meets furnace sizing limit: (A, B, C, or N/A) [30]							
A: For low-load spaces (≤ 10 kBtuh), furnace output capacity is ≤ 40 kBtuh							
B: When Used for Heating Only	C: When Paired With Cooling						
100 – 400%	Recommended: 100 – 140% Allowed: 100 – 400%						

Appendix A – Supplementary tables for Section 5

5. Dwelling-Unit Duct Design

5.2 Room-by-room design airflows documented below (which must sum to the mode with the higher Design HVAC fan airflow). [13, 49, 50]

Name of the unit plan:			Name of the unit plan:		
Design HVAC fan airflow: [51] Cooling mode _____ CFM Heating mode _____ CFM			Design HVAC fan airflow: [51] Cooling mode _____ CFM Heating mode _____ CFM		
Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode _____ Heating mode _____			Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode _____ Heating mode _____		
Design total external static pressure (corresponding to the mode with the higher airflow above): [53] _____ IWC			Design total external static pressure (corresponding to the mode with the higher airflow above): [53] _____ IWC		
	Room Name	Design Airflow (CFM)		Room Name	Design Airflow (CFM)
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
	Total for all rooms			Total for all rooms	
Name of the unit plan:			Name of the unit plan:		
Design HVAC fan airflow: [51] Cooling mode _____ CFM Heating mode _____ CFM			Design HVAC fan airflow: [51] Cooling mode _____ CFM Heating mode _____ CFM		
Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode _____ Heating mode _____			Design HVAC fan speed setting (e.g., low, medium, high): [52] Cooling mode _____ Heating mode _____		
Design total external static pressure (corresponding to the mode with the higher airflow above): [53] _____ IWC			Design total external static pressure (corresponding to the mode with the higher airflow above): [53] _____ IWC		
	Room Name	Design Airflow (CFM)		Room Name	Design Airflow (CFM)
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
	Total for all rooms			Total for all rooms	

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If pursuing Track A – HVAC Grading by Rater, complete this page. [3]

Building Name: _____ Number of Units: _____ Permit Date: _____

Building Address: _____ City: _____ State: _____

	Must Correct	Rater [4] Verified	N/A
1. Partnership Status			
1.1 Rater has verified and documented that builder or developer has an ENERGY STAR partnership agreement using www.energystar.gov/ResPartnerDirectory. Builder name: _____ Developer name: _____	☐	☐	-
1.2 ASHRAE Only: Rater has verified modeler is listed in the online directory: www.energystar.gov/ASHRAEdirectory. Modeler name: _____ (Not required for buildings in California)	☐	☐	☐
1.3 Rater has verified and documented that their company has an ENERGY STAR partnership agreement using www.energystar.gov/ResPartnerDirectory. [5]	☐	☐	-
1.4 Rater(s) signing checklists attest that they have completed EPA-recognized training and are credentialed by a Home Certification Organization (HCO) or meet the credential requirements of a Multifamily Review Organization (MRO).	☐	☐	-
1.5 Certification is being pursued for the whole building; all units and common spaces in the building are designed to meet the requirements below. [6]	☐	☐	-
2. High-Performance Insulation & Fenestration			
2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [7, 8, 9, 10, 11, 12, 13]	☐	☐	-
2.2 In CZ 1-3, 4A, and 4B, specified windows, skylights, and doors that are ≥ 50% glazed achieve the area-weighted average SHGC described in Footnote 11 and 13 and are documented through ERI energy modeling or in the Multifamily Workbook. [7, 13]	☐	☐	☐
3a. Review of ANSI / RESNET / ACCA 310 HVAC Design Report with ENERGY STAR Supplements [14]			
3a.1 The following documentation collected for records, with no applicable Items left blank. [15]			
3a.1.1 For all dwelling units, HVAC design report(s) compliant with ANSI / RESNET / ACCA 310 and the National HVAC Design Supplement(s) to Std. 310 for Dwellings & Units.	☐	☐	-
3a.1.2 National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems.	☐	☐	☐
3a.2For all dwelling units, ANSI / RESNET / ACCA 310 design review criteria have been met for applicable housing type.	☐	☐	-
3a.3 Prescriptive Path: Dwelling Unit Mechanical Ventilation is <150% of ASHRAE 62.2-2013 requirements. [16]	☐	☐	☐
3a.4 Dwelling Units: Total occupant gains do not exceed 645 Btuh per occupant. [17]	☐	☐	☐
3a.5 Dwelling Units: Non-occupant internal gains are less than 3,600 Btuh.	☐	☐	☐
3a.6 Dwelling Units: Cooling sizing % is within the cooling sizing limit selected by the HVAC designer.	☐	☐	☐
3a.7 Common spaces: Item 2.3 of the National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems is completed for all spaces in the building listed in Footnote 18.	☐	☐	☐
3a.8 Common spaces: Item 2.4 is equal to or greater than Item 2.3.	☐	☐	☐

Rater Name: _____ Date of Review: _____

Rater Signature: _____ Rater Company Name: _____

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If pursuing Track B – HVAC Testing by FT Agent, complete this page.

Building Name: The Residence at Carter Lake Number of Units: 54 Permit Date: 8/2025

Building Address: Ninth Street and Avenue K City: Carter Lake State: IA

	Must Correct	Rater [4] Verified	N/A
1. Partnership Status			
1.1 Rater has verified and documented that builder or developer has an ENERGY STAR partnership agreement using www.energystar.gov/partnerlocator. Builder name: _____ Developer name: _____	☐	☐	-
1.2 ASHRAE Only: Rater has verified modeler is listed in the online directory: www.energystar.gov/ASHRAEdirectory. Modeler name: _____ (Not required for buildings in California)	☐	☐	☐
1.3 Rater has verified and documented that their company has an ENERGY STAR partnership agreement using www.energystar.gov/ResPartnerDirectory. [5]	☐	☐	-
1.4 Rater(s) signing checklists attest that they have completed EPA-recognized training and are credentialed by a Home Certification Organization (HCO) or meet the credential requirements of a Multifamily Review Organization (MRO).	☐	☐	-
1.5 Certification is being pursued for the whole building; all units and common spaces in the building are designed to meet the requirements below. [6]	☐	☐	-
2. High-Performance Insulation & Fenestration			
2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [7, 8, 9, 10, 11, 12, 13]	☐	☒	-
2.2 In CZ 1-3, 4A, and 4B, specified windows, skylights, and doors that are ≥ 50% glazed achieve the area-weighted average SHGC described in Footnote 11 and 13 and are documented through ERI energy modeling or in the Multifamily Workbook. [7, 13]	☐	☐	☒
3b. Review of ENERGY STAR MFNC National HVAC Design Report [19, 20]			
3b.1 National HVAC Design Report(s) collected for records, with no applicable Items left blank.	☐	☒	-
3b.2 National HVAC Design Report(s) reviewed by Rater for the following parameters (Nat'l MFNC HVAC Design Report Item # in parenthesis):			
3b.2.1 Prescriptive Path: Dwelling Unit Mechanical Ventilation (2.7) is <150% of ASHRAE 62.2-2013 requirements. [16]	☐	☐	☒
3b.2.2 Cooling season and heating season outdoor design temperatures used in loads (3.4) are within the limits defined for the State and County, or US Territory, where the building will be built, or the designer has provided an allowance from the EPA to use alternative values. All limits are published at www.energystar.gov/hvacdesigntemps. Note that revised (i.e., 2019 Edition) limits are required to be used for all HVAC Design Reports generated after 07/01/2020.[21]	☐	☒	☐
3b.2.3 Number of occupants used in loads (3.6) is within ± 2 of each dwelling unit to be certified and total occupant gains (3.7) do not exceed 645 Btuh per occupant. [17]	☐	☒	☐
3b.2.4 Conditioned floor area used in loads (3.8) is between 100 sq. ft. smaller and 300 sq. ft. larger than each dwelling unit to be certified. [22]	☐	☒	☐
3b.2.5 Window area used in loads (3.9) is between 15 sq. ft. smaller and 60 sq. ft. larger than each dwelling unit to be certified, or for dwelling units to be certified with > 500 sq. ft. of window area, between 3% smaller and 12% larger.[23]	☐	☒	☐
3b.2.6 Predominant window SHGC used in loads (3.10) is within 0.1 of predominant value in each dwelling unit to be certified. [24]	☐	☒	☐
3b.2.7 Mechanical ventilation used in loads (3.12) is the same as the ventilation design (2.7) for the given unit plan.	☐	☒	☐
3b.2.8 Non-occupant internal gains (3.13) are less than 3,600 Btuh.	☐	☒	☐
3b.2.9 Sensible & total heat gain are documented (3.15, 3.17) for the configuration of each dwelling unit to be certified. [25]	☐	☒	☐
3b.2.10 Cooling sizing % (4.18) is within the cooling sizing limit (4.19) selected by the HVAC designer.	☐	☒	☐
3b.2.11 Common spaces: Item 2.8 is completed for all spaces in the building listed in Footnote 18.	☐	☒	☐
3b.2.12 Common spaces: Item 2.9 is equal to or greater than Item 2.8.	☐	☒	☐

Rater Name: Michael Boerst Date of Review: 8-5-2025

Rater Signature: _____ Rater Company Name: Heartland Energy Consultants

4. Additional Construction Document Review – Recommended, not required	
4.1 Air Sealing: Review construction documents to verify that air-sealing details at assemblies adjacent to the exterior, other buildings, or unconditioned spaces are represented which, at a minimum, demonstrate compliance with checklist items in Section 4 of the National Rater Field Checklist (noted with an asterisk below). Items 4.1.4, 4.1.9 and 4.1.10 are not verified by the Rater in the field, but are recommended.	
4.1.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations are sealed, with blocking / flashing as needed*.	☐
4.1.2 Attic access panels, roof hatches and drop-down stairs are gasketed, (i.e., not caulked) or equipped with covers that are gasketed*.	☐
4.1.3 Recessed lighting fixtures are ICAT labeled and gasketed*.	☐
4.1.4 Continuous top plate or blocking is at top of walls adjoining unconditioned space including at balloon-framed parapets, and sealed.	☐
4.1.5 Drywall is sealed to top plate during installation, or from the attic side at all unconditioned attic / wall interfaces. Drywall adhesive (but not other construction adhesives) is permitted to be used*.	☐
4.1.6 Rough opening around windows & exterior doors is sealed*.	☐
4.1.7 Assemblies that separate attached garages from occupiable space are sealed. In addition, an air barrier is installed, sealed, and aligned with these assemblies*. [26]	☐
4.1.8 Doors adjacent to unconditioned space (e.g., attics, garages, basements), ambient conditions, or a unit entrance to a corridor / stairwell, made substantially air-tight with door seal and weatherstripping or equivalent gasket*.	☐
4.1.9 Above-grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to conditioned space. [27]	☐
4.1.10 The gap between the common wall (e.g., the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries.	☐
4.2 Dwelling Unit Compartmentalization	
4.2.1 Review construction documents to verify that air-sealing details [28] are represented such that air exchange between the dwelling unit and outside as well as the dwelling unit and other adjacent spaces is minimized and designed to achieve compartmentalization less than or equal to the following CFM50 per sq. ft. of dwelling unit enclosure area, following procedures in ANSI / RESNET / ICC 380: For all Versions and Paths except National v1.3, Prescriptive Path: ≤ 0.30 CFM50 For National v1.3, Prescriptive Path: ≤ 0.27 CFM50	☐
4.2.2 Seal all spaces 4.1.1-4.1.10 on adiabatic unit enclosure assemblies.	☐
4.3 Prescriptive Path: Verify that Window-to-wall ratio ≤ 30%. [29]	☐
4.4 Verify that fully-aligned air barrier details are in compliance with checklist items in Section 2 of the National Rater Field Checklist.	☐
4.5 Verify that thermal bridging details are in compliance with checklist items in Section 3 of the National Rater Field Checklist.	☐
4.6 Verify that HVAC details are in compliance with checklist items in Sections 5 - 10 of the National Rater Field Checklist.	☐
4.6.1 Verify that HVAC design includes access and means to measure the dwelling-unit mechanical ventilation airflow rate.	☐
4.6.2 Verify that bedrooms with design airflow ≥ 150 CFM are specified with a combination of transfer grilles, jump ducts dedicated return ducts, and/or undercut doors to achieve a Rater-measured pressure differential ≥ -5 Pa and ≤ +5 Pa with respect to the main body of the dwelling unit when all air handlers are operating.	☐
4.6.3 Verify that Functional Testing Agent(s) hold(s) credential required to complete the applicable sections of the National HVAC Functional Testing Checklist for all HVAC equipment in the building. For Track A, a Functional Testing Agent is not needed to complete Sections 2 and 3 for HVAC systems that will be verified and graded by the Rater. [30]	☐
4.6.4 Verify that dwelling unit local kitchen exhausts directly to the outdoors	☐
4.7 Verify that Domestic Hot Water, Lighting, Appliances, Plumbing Fixtures, and Whole Building Utility Data Acquisition Strategy details are in compliance with checklist items in Sections 11 – 14 of the National Rater Field Checklist.	☐

Footnotes:

1. This Checklist applies to all dwelling units, sleeping units, common spaces [2], and garages (open or enclosed) in the building being certified, and where specified, parking lots. These requirements apply to all Paths, unless otherwise specified. These requirements do not apply to parking garages or lots where the cost of the energy use of the parking garage or lot is not the responsibility of the Builder/Developer, Building Owner or Property Manager. This Checklist does not apply to commercial or retail spaces, except in the ASHRAE Path, if included in the energy model and the savings contribute to achieving the Performance Target. This Checklist does not apply to common spaces that are located in buildings on the property without any dwelling or sleeping units. A 'sleeping unit' as defined by ANSI / RESNET / ICC 301, is a room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Where the term 'dwelling unit' is used in this Checklist, the requirement is also required of 'sleeping' units. The term 'building' refers to a structure that encompasses dwelling/sleeping units and (if present) common spaces, sharing one or more of the following attributes: a common street address, a common entrance or exit, central/shared mechanical systems, or structurally interdependent wall or roof systems. Attached structures such as 4-story two-unit structures (commonly referred to as "2-over-2s") may be considered separate buildings if they are divided by a vertical fire separation wall from the foundation to the roof sheathing and share none of the other attributes listed above. A skyway or a breezeway that connects two structures is not considered a common entrance or exit.
2. The term 'common space' refers to any spaces in the building being certified that serve a function in support of the residential part of the building that is not part of a dwelling or sleeping unit. This includes spaces used by residents, such as corridors, stairs, lobbies, laundry rooms, exercise rooms, residential recreation rooms, and dining halls, as well as offices and other spaces used by building management, administration or maintenance in support of the residents. For the ASHRAE Path, the requirements for 'common spaces' apply to commercial or retail spaces where they are included in the energy model and savings contribute to achieving the Performance Target.
3. To be eligible for Track A – HVAC Grading by Rater, dwelling units must have at least one unitary HVAC system including air conditioners or heat pumps up to 65 kBtuh, or furnaces up to 125 kBtuh (i.e., within the scope of ANSI / RESNET / ACCA 310). Track A – HVAC Grading by Rater shall use ANSI / RESNET / ACCA 310 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO or MRO that the building is being certified under for all dwelling unit systems.
4. The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater, Approved Inspector, as defined by ANSI / RESNET / IECC 301, or an equivalent designation as determined by a HCO or MRO; and, b) have attended and successfully completed an EPA-recognized training class. See www.energystar.gov/mftraining.

   As stated in the National Program Requirements, Raters who operate under an MRO or an HCO Sampling Protocol are permitted to verify any Checklist Item designated "Rater Verified" using an MRO or HCO-approved sampling protocol. No parties other than Raters are permitted to use sampling to complete this Checklist.
5. Raters are only required to document the partnership status of their company once, for the first home that the Rater certifies for them.
6. The whole building must be submitted to the HCO or MRO for certification after required verification is complete for all units and common spaces, unless using the conditional certification process described in the ENERGY STAR Certification Process in the applicable Program Requirements.
7. For all Versions except National v1.2 and 1.3, the 2009 IECC Climate Zone designations are applicable, as defined and illustrated in Section R301 of the code. For National v1.2 and 1.3, the 2021 IECC Climate Zone designations are applicable, as defined and illustrated in Section R301 of the code. Note that some locations have shifted to a different Climate Zone in the 2021 IECC compared to prior editions.
8. The building thermal envelope must include assemblies that are adjacent to other buildings, the exterior, or a garage; however, it does not include assemblies that separate Dwelling Units and Common Spaces from commercial or retail spaces within the building.
9. Note that Items 1.5 through 1.8 of the National Rater Field Checklist shall be met regardless of the UA or TC tradeoffs calculated.
10. Slab edge insulation shall be assessed for slab-on-grade floors with a floor surface less than 24 in. below grade, including where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the building. Whether insulated or not, these perimeters must be documented in the energy model and, where using to document compliance with Item 2.1, the Multifamily Workbook. F-Factors for use in the Multifamily Workbook shall be determined using the guidance available at www.energystar.gov/F-Factor.
11. For all Versions except National v1.2 and National v1.3, the total building thermal envelope UA (i.e., accounting for ceilings, walls, floors, slabs, and fenestration) shall be less than or equal to the thermal backstop target in Table 1 resulting from multiplying the U-factors specified in Table 1 by the same assembly area as the building to be certified.

    For National v1.2, the total building thermal envelope UA (i.e., accounting for ceilings, walls, floors, slabs, and fenestration) shall be less than or equal to the thermal backstop target in Table 2 resulting from multiplying assembly U-factors specified in Table 2 by the same assembly area as the building to be certified. For buildings permitted before 01/01/2025 and following the ERI or ASHRAE Path only, the thermal backstop target shall be less than or equal to 105% of the total UA resulting from multiplying the U-factors in Table 2 by the same assembly area as the building to be certified.

    For National v1.3, the total building thermal envelope TC shall be less than or equal to the thermal backstop target in Table 3 resulting from using the assembly factors specified in Table 3 and using Equation 4-1 of the 2024 IECC.

    Where noted in Table 1, 2 and 3, the term "classified as "Class AW"' indicates windows that are classified as such under the North American Fenestration Standard (AAMA / WDMA / CSA 101 / I.S.2 / A440).

ENERGY STAR Multifamily New Construction
National Rater Design Checklist Footnotes, Version 1.1/1.2/1.3 (Rev. 05)

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2012 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	2009 IECC 502.3
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			

Table 2: For National Version 1.2

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2021 IECC R402.1.2	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2021 IECC C402.4	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2021 IECC C402.4.4 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2021 IECC R402.1.2	2021 IECC R402.1.2	2021 IECC R402.1.2	2021 IECC C402.4	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2021 IECC C402.1.4 "Group R" Column	2021 IECC C402.1.4 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2021 IECC R402.1.2	2021 IECC R402.1.2	2021 IECC R402.1.2	2021 IECC C402.4	2021 IECC C402.4
ASHRAE, Commercial Option	≤ 100% of total UA	2021 IECC C402.1.4 "Group R" Column	2021 IECC C402.1.4 "All Other" Column			

Table 3: For National Version 1.3

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total TC	ENERGY STAR MF Reference Design	2024 IECC R402.1.2	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2024 IECC C402.5	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total TC		2024 IECC C402.1.2 "All Other" Column			
ERI, Residential Option	In CZ 1-2, ≤ 108% of total TC In CZ 3-8, ≤ 115% of total TC	2024 IECC R402.1.2	2024 IECC R402.1.2	2024 IECC R402.1.2	2024 IECC C402.5	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total TC	2024 IECC C402.1.2 "Group R" Column	2024 IECC C402.1.2 "All Other" Column			
ASHRAE, Residential Option	In CZ 1-2, ≤ 108% of total TC In CZ 3-8, ≤ 115% of total TC	2024 IECC R402.1.2	2024 IECC R402.1.2	2024 IECC R402.1.2	2024 IECC C402.5	2024 IECC C402.5
ASHRAE, Commercial Option	≤ 100% of total TC	2024 IECC C402.1.2 "Group R" Column	2024 IECC C402.1.2 "All Other" Column			

12. The calculations shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

    Where documenting UA within the workbook, F-factors and slab perimeter lengths will be used in place of U-factors and areas.

    The following exceptions apply:

    i. When referencing the 2009 IECC Commercial chapter, buildings in Climate Zone 4 and Climate Zone 5/Marine 4 may use U-0.089 and U-0.064 respectively for Group R wood-framed walls instead of the printed U-0.064 and U-0.051.

    ii. In jurisdictions designated by a code official as having Very Heavy Termite Infestation, the total UA limit shall be calculated by replacing the code-required slab insulation R-value and depth with the slab insulation R-value and depth specified in the building to be certified.

    iii. Where using the Multifamily Workbook to document compliance, assemblies may alternatively meet the U-factor or F-Factor by building component rather than using the total UA or TC approach.

    iv. The thermal backstop may be met through meeting the Residential option for dwelling units and the Commercial option for common spaces. It is not permitted to choose the Residential chapter for one building component for dwelling units and the Commercial chapter for another building component for dwelling units.

13. The area-weighted average SHGC of all windows, skylights, and doors that are ≥ 50% glazed must not exceed the area-weighted average of the SHGC requirements specified in the Fenestration section of the appliable Table in Footnote 11. If no NFRC rating is noted on the window or in product literature (e.g., for site-built fenestration), select the U-factor and SHGC value from Tables 4 and 10, respectively, in 2013 ASHRAE Handbook of Fundamentals, Chapter 15. Select the highest U-factor and SHGC value among the values listed for the known window characteristics (e.g., frame type, number of panes, glass color, and presence of low-e coating). Alternatively, where the U-factor is determined in accordance with NFRC 100 by a laboratory accredited by a nationally recognized accreditation organization, such as the NFRC, documentation provided by the laboratory or manufacturer listing the assembly U-factor and SHGC can be used in lieu of NFRC labels. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion. The following exceptions apply:

    i. 5% of all combined fenestration area (glazed and opaque) shall be exempt from the U-factor and SHGC requirements, and shall be excluded from the area-weighted averages calculated in Item 2.1 and 2.2.

    ii. In Phius or PHI certified buildings, where triple-glazed window assemblies with thermal breaks / spacers between the panes are used, such windows meet the intent of Items 2.1 and 2.2 and shall be excluded from the area-weighted averages calculated.

14. If pursuing Track A, all dwelling units must complete Items 3a.1.1 and 3a.2. Item 3a.3 shall be completed for dwelling units in buildings pursuing the Prescriptive Path. Items 3a.4 through 3a.6 shall be completed if any dwelling units in the building to be certified contain an air conditioner or heat pump; otherwise, 'N/A' shall be checked. All common space systems and central systems must be documented within the HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems.

15. As an alternative, the ENERGY STAR SFNH National HVAC Design Report may be collected in lieu of the ENERGY STAR National HVAC Design Supplement to Std. 310 for Dwellings & Units. In such cases, at least two documents will still be collected – an HVAC design report compliant with ANSI / RESNET / ACCA Std. 310 plus the ENERGY STAR SFNH National HVAC Design Report. Note that for buildings with more than one HVAC system, one ENERGY STAR SFNH National HVAC Design Report per system would need to be collected. For buildings

with central systems or common space systems, the ENERGY STAR National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems must also be collected.

16. Raters may use this table to determine the maximum ventilation rate allowed. Where the Exhaust Fan Type in Item 2b of the HVAC Design Report indicates "Continuous" for both Bathroom and Kitchen, the Rater may use this equation to determine the maximum ventilation rate allowed: 30 CFM x number of bathrooms + 75 CFM.

	Number of Bedrooms				
Floor area	**1**	**2**	**3**	**4**	**5**
<500	45	57	67.5	79.5	90
501-1000	67.5	79.5	90	102	112.5
1001-1500	90	102	112.5	124.5	135
1501-2000	112.5	124.5	135	147	157.5
2001-2500	135	147	157.5	169.5	180
2501-3000	157.5	169.5	180	192	202.5
3001-3500	180	192	202.5	214.5	225
3501-4000	202.5	214.5	225	237	247.5
4001-4500	225	237	247.5	259.5	270
4501-5000	247.5	259.5	270	282	292.5

17. To determine the number of occupants among all HVAC systems in the dwelling unit, calculate the number of bedrooms, as defined below, and add one. The number of occupants used in loads must be within ± 2 of the dwelling unit to be certified.

    A bedroom is defined by ANSI / RESNET / ICC 301-2014 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 in. 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.

18. The following spaces require outdoor air ventilation: corridors, offices, break rooms, gyms, fitness centers, exercise rooms, lobbies, community rooms, meeting rooms, multi-purpose rooms, lounges, laundry rooms, swimming pools, daycares, classrooms, shared or commercial kitchens, shared dining rooms, and computer rooms.

19. If pursuing Track B, then Section 3b shall be fully completed if any dwelling unit contains split air conditioners, unitary air conditioners, air-source heat pumps, and water-source (i.e., geothermal) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts), or furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts). For a building without any of these system types in the dwelling units, collection of the National HVAC Design Report is still required and reviewed per Items 3b.2.1, 3b.2.11 and 3b.2.12 where applicable, but the EPA does not require that the report be reviewed per Item 3b.2.2 – 3b.2.10. For Track B systems that are documented using the SFNH HVAC Design Report, where room-by-room loads are calculated using Unabridged ACCA Manual J v8 and where occupant gains and non-occupant gains are not reported, items 3b.2.3 and 3b.2.8 may be marked "N/A". Where the HVAC designer has checked the "N/A" box in Section 3 of the National HVAC Design Report, the Rater shall confirm that all dwelling unit heating and cooling systems are exempt (i.e., non-ducted mini-splits or multi-splits, PTACs, or PTHPs) and mark "N/A" for Items 3b.2.2-3b.2.10.

20. The Rater shall collect the National HVAC Design Report(s) per building. See Footnote 1 of the National HVAC Design Report for alternatives. Where using an ENERGY STAR Single-Family New Homes National HVAC Design Report, Rater must still review all Items under 3b.2. Regardless of whether the "unit-specific design", "group design", or "worst-case design" box has been checked in Item 3.2 of the National HVAC Design Report, the system design as documented on the National HVAC Design Report must fall within the tolerances in Item 3b.2 for the unit to be certified. The Rater is only responsible for verifying that the designer has not left any applicable items blank on the National HVAC Design Report and for verifying the discrete objective parameters in Item 3b.2 of this Checklist, not for verifying the accuracy of every input on the National HVAC Design Report. Buildings certified under Rev. 05 of the program requirements are permitted to use any Revision of the MFNC National HVAC Design Report.

21. Visit www.energystar.gov/hvacdesigntemps for the maximum cooling season design temperature and minimum heating season design temperature permitted and the process for a designer to obtain an allowance from the EPA. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 °F, then the same report could be used in Fairfax County (which has a higher limit of 94 °F) but not in Arlington County (which has a lower limit of 92 °F).

22. Conditioned Floor Area for the dwelling unit to be certified shall be calculated in accordance with the definition in ANSI / RESNET / ICC 301-2019.

23. Window area for the dwelling unit to be certified shall be calculated in accordance with the on-site inspection protocol provided in Normative Appendix B of ANSI / RESNET / ICC 301-2019.
24. “Predominant” is defined as the SHGC value used in the greatest amount of window area in the dwelling unit.
25. The Rater shall confirm that the designer has documented the loads for all the configurations (e.g., level, orientation) that the dwelling unit might be built in. For example, if a unit plan will only be built in a specific level and orientation (e.g., top-floor, facing South), then the designer only needs to document the loads for this one configuration. Orientation represents the direction that the front door of the dwelling unit is facing.
26. For dwelling or sleeping units adjacent to garages, the EPA recommends, but does not require, carbon monoxide (CO) alarms installed in a central location in the immediate vicinity of each separate sleeping zone and according to NFPA 720.
27. Existing sill plates (e.g., in a building undergoing a substantial reconstruction or rehabilitation) on the interior side of structural masonry or monolithic walls may not be able to complete this Item. In addition, other existing sill plates resting atop concrete or masonry and adjacent to conditioned space can in lieu of using a gasket, be sealed with caulk, foam, or equivalent material at both the interior seam between the sill plate and the subfloor and the seam between the top of the sill plate and the sheathing.
28. Recommended air leakage paths to be sealed include, but are not limited to the following:
    a. Plumbing penetrations, including those from water piping, drain waste and vent piping, HVAC piping, and gas line piping.
    b. Electrical penetrations, including those for receptacle outlets, lighting outlets / fixtures, communications wiring, thermostats, and smoke alarms.
    c. HVAC penetrations, including those for fans and for exhaust, supply, transfer, and return air ducts.
    d. Envelope penetrations, including at the intersection of baseboard trim and floor, at the intersection of walls and ceilings, around window trim and dwelling unit doors, including the door latch hole.
29. Window-to-Wall ratio is taken as the sum of all window area divided by the total exterior above-grade wall area. All decorative glass and skylight window area contribute to the total window area to above-grade wall ratio (WWR). Spandrel sections of curtain wall systems contribute to the above-grade wall area.
30. Functional Testing Agents must hold an approved credential, as listed at www.energystar.gov/ftas, or must be a representative of the Original Equipment Manufacturer (OEM), or a contractor credentialed by an HVAC Quality Installation Training and Oversight Organization (H-QUITO), if not completing Sections 5 and higher. Functional Testing Agents may not be the installing contractor, nor employed by the same company as the installing contractor, unless they are a credentialed contractor. An explanation of the credentialing process and links to H-QUITOs, which maintain lists of credentialed contractors, can be found at www.energystar.gov/findhvac. A directory of other FT Agents can be found at www.energystar.gov/ftas.

ATTACHMENT B: PROJECTED WORST-CASE REPORTS

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: vwYMrn0L

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

60 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$874

*Relative to an average U.S. home

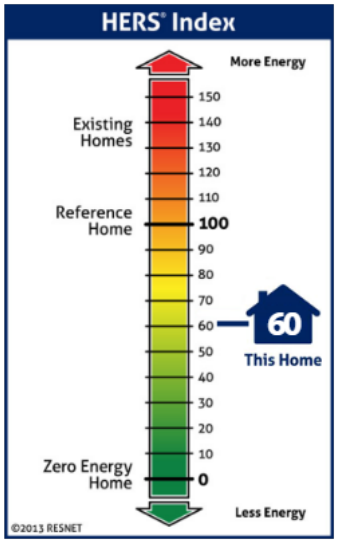
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	7.1	$262
Cooling	0.7	$25
Hot Water	4.4	$165
Lights/Appliances	8.9	$330
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**21.1**	**$783**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, end unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	685 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	N/A

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: 2rVGrMw2

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

57 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$938

*Relative to an average U.S. home

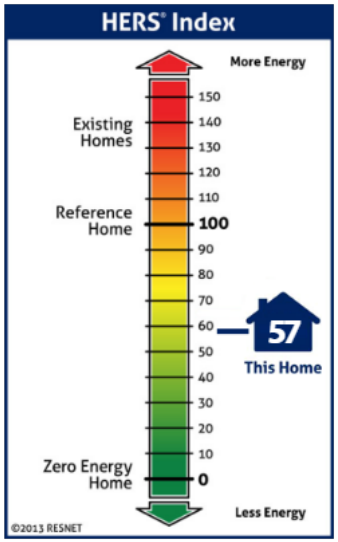
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	6.1	$226
Cooling	1.5	$57
Hot Water	4.4	$165
Lights/Appliances	8.9	$330
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**21.0**	**$779**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, end unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	685 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
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Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: L0VDGlJv

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

56 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$982

*Relative to an average U.S. home

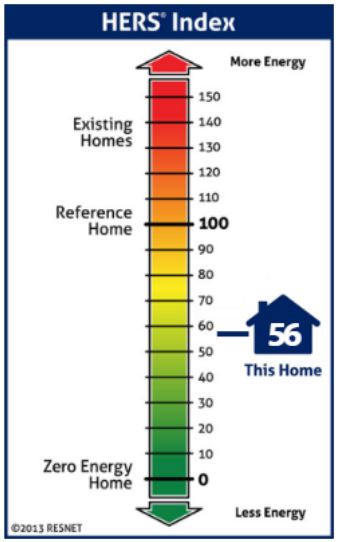
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	6.4	$238
Cooling	1.7	$64
Hot Water	4.4	$165
Lights/Appliances	8.9	$330
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**21.5**	**$797**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, end unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	685 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 9.53 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Vaulted Roof, R-49
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: dE1ZJ85d

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

58

Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$839

*Relative to an average U.S. home

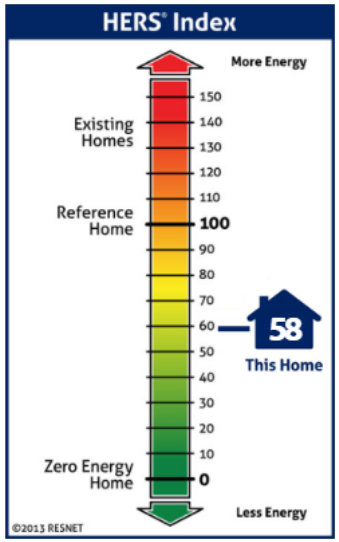
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	5.0	$187
Cooling	0.8	$31
Hot Water	4.4	$165
Lights/Appliances	8.9	$329
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**19.2**	**$711**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	673 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	N/A

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: LO30yBBL

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

56 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$898

*Relative to an average U.S. home

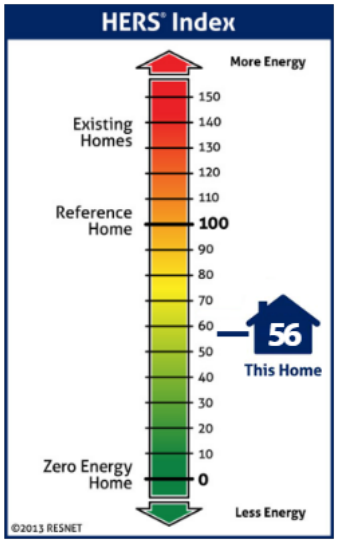
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	4.7	$173
Cooling	1.4	$51
Hot Water	4.4	$165
Lights/Appliances	8.9	$329
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**19.3**	**$718**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	673 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Ekotrope RATER - Version:5.1.0.3684

Energy savings calculated without modifications to the energy model. (As Modeled)

The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: L0VDGXAv

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

55 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$942

*Relative to an average U.S. home

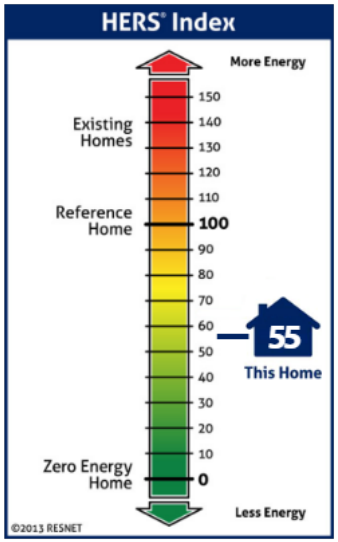
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	5.1	$191
Cooling	1.6	$58
Hot Water	4.4	$165
Lights/Appliances	8.9	$329
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**20.0**	**$741**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	673 ft²
Number of Bedrooms:	1
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 9.53 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Vaulted Roof, R-49
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

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Digitally signed: 8/6/25 at 4:58 PM

ekotrope

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Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
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Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: L9MwRZzL

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

58 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

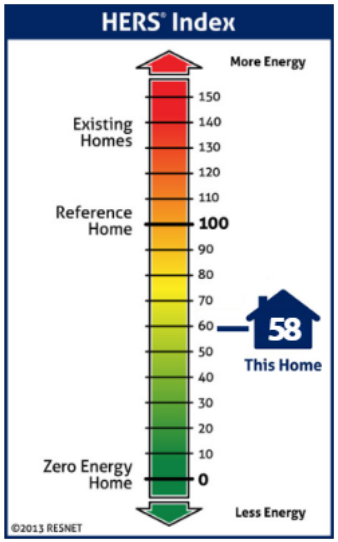
$1,055
*Relative to an average U.S. home

Home:
Ninth Street and Avenue K
Carter Lake, IA 51510
Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	6.2	$229
Cooling	1.1	$40
Hot Water	6.1	$228
Lights/Appliances	10.3	$381
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**23.6**	**$877**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	860 ft²
Number of Bedrooms:	2
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	N/A

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: Lz1kE7E2

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

56 Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$1,132

*Relative to an average U.S. home

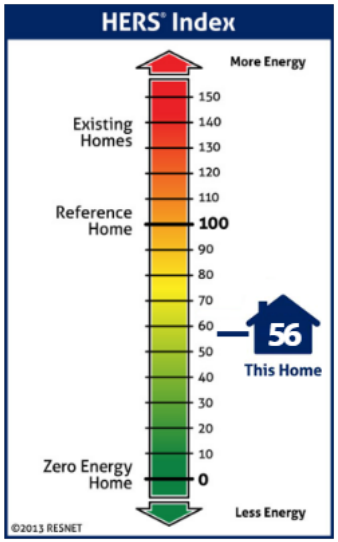
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	5.7	$211
Cooling	1.8	$67
Hot Water	6.1	$228
Lights/Appliances	10.3	$381
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**23.9**	**$886**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	860 ft²
Number of Bedrooms:	2
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 8.80 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Adiabatic, R-98
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
319-440-6903

Rating Provider: Building Efficiency Resources
PO Box 1769 Brevard, NC 28712
800-399-9620

National Mortgage Industry HERS Accreditation Registry No. 1998-146

Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

Energy savings calculated without modifications to the energy model. (As Modeled)

Ekotrope RATER - Version:5.1.0.3684
The Energy Rating Disclosure for this home is available from the Approved Rating Provider.
This report does not constitute any warranty or guarantee.

Home Energy Rating Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: dmaxryXd

HEARTLAND ENERGY CONSULTANTS

HERS® Index Score:

54

Your home's HERS score is a relative performance score. The lower the number, the more energy efficient the home. To learn more, visit www.hersindex.com

Annual Savings

$1,188

*Relative to an average U.S. home

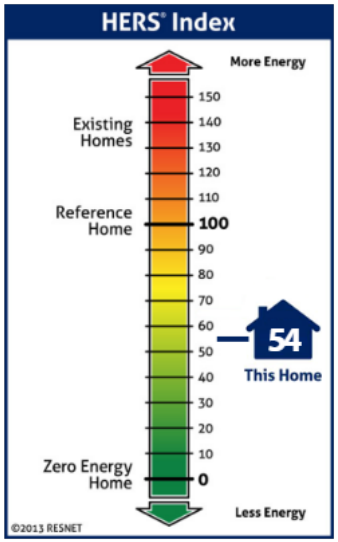
Home:
Ninth Street and Avenue K
Carter Lake, IA 51510

Builder:

Your Home's Estimated Energy Use:

	Use [MBtu]	Annual Cost
Heating	6.3	$234
Cooling	2.0	$74
Hot Water	6.1	$228
Lights/Appliances	10.3	$381
Service Charges		$0
Generation (e.g. Solar)	0.0	$0
Total:	**24.7**	**$917**

This home meets or exceeds the criteria of the following:



Home Feature Summary:

Home Type:	Apartment, inside unit
Model:	N/A
Community:	The Residence at Carter Lake
Conditioned Floor Area:	860 ft²
Number of Bedrooms:	2
Primary Heating System:	Air Source Heat Pump • Electric • 9 HSPF2
Primary Cooling System:	Air Source Heat Pump • Electric • 17.1 SEER2
Primary Water Heating:	Residential Water Heater • Electric • 0.93 UEF
House Tightness:	0.3 CFM50 / s.f. Shell Area (Adjusted Infiltration: 9.53 ACH50)
Ventilation:	80 CFM • 11 Watts • Exhaust Only
Duct Leakage to Outside:	Untested Forced Air
Above Grade Walls:	R-21
Ceiling:	Vaulted Roof, R-49
Window Type:	U-Value: 0.27, SHGC: 0.25
Foundation Walls:	N/A
Framed Floor:	R-98

Rating Completed by:

Energy Rater: Michael Boerst
RESNET ID: 7176148

Rating Company: Heartland Energy Consultants LLC
3136 S Ave North English, IA 52316
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Michael Boerst

Michael Boerst, Certified Energy Rater
Digitally signed: 8/6/25 at 4:58 PM

ekotrope

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Ekotrope RATER - Version:5.1.0.3684
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Generated by RES*check-Web* Software

Compliance Certificate

Project The Residence at Carter Lake

Energy Code:	**2015 IECC**
Location:	**Carter Lake, Iowa**
Construction Type:	**Multi-family**
Project Type:	**New Construction**
Project SubType:	**None**
Conditioned Floor Area:	**51,409 ft2**
Glazing Area	**17%**
Climate Zone:	**5 (6300 HDD)**
Permit Date:	
Permit Number:	
All Electric	**true**
Is Renewable	**false**
Has Charger	**false**
Has Battery:	**false**
Has Heat Pump:	**true**

Construction Site:
Avenue K and Ninth Street
Carter Lake, IA

Owner/Agent:

Designer/Contractor:

Compliance: Passes using UA trade-off

Compliance: **10.0% Better Than Code** Maximum UA: **2900** Your UA: **2609**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules.
It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Slab-on-grade tradeoffs are no longer considered in the UA or performance compliance path in REScheck. Each slab-on-grade assembly in the specified climate zone must meet the minimum energy code insulation R-value and depth requirements.

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Prop. U-Factor	Req. U-Factor	Prop. UA	Req. UA
Community Room Roof: Flat Ceiling or Scissor Truss	504	13.0	36.0	0.020	0.026	10	13
Ceiling: Flat Ceiling or Scissor Truss	16,964	13.0	36.0	0.020	0.026	339	441
Exterior Walls: Wood Frame, 16" o.c.	23,490	21.0	0.0	0.057	0.060	1112	1170
Opaque Doors: Solid Door (under 50% glazing)	76			0.170	0.320	13	24
Storefront Doors: Glass Door (over 50% glazing)	97			0.730	0.320	71	31
Vinyl Windows: Vinyl Frame	3,433			0.270	0.320	927	1099
Storefront Windows: Metal Frame w/ Thermal Break	381			0.360	0.320	137	122
Slab on Grade: Slab-On-Grade (Unheated) Insulation depth: 2.0' Insulation position: No Insulation	784		10.0	0.767	0.767	0	0

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2015 IECC requirements in RES*check* Version : REScheck-Web and to comply with the mandatory requirements listed in the RES*check* Inspection Checklist.

Michael Boerst - Energy Consultant		8-6-25
Name - Title	Signature	Date