

Quality Assurance Data Files Made Easy

Ben Graham of EnergyLogic & Chris McTaggart of The BER

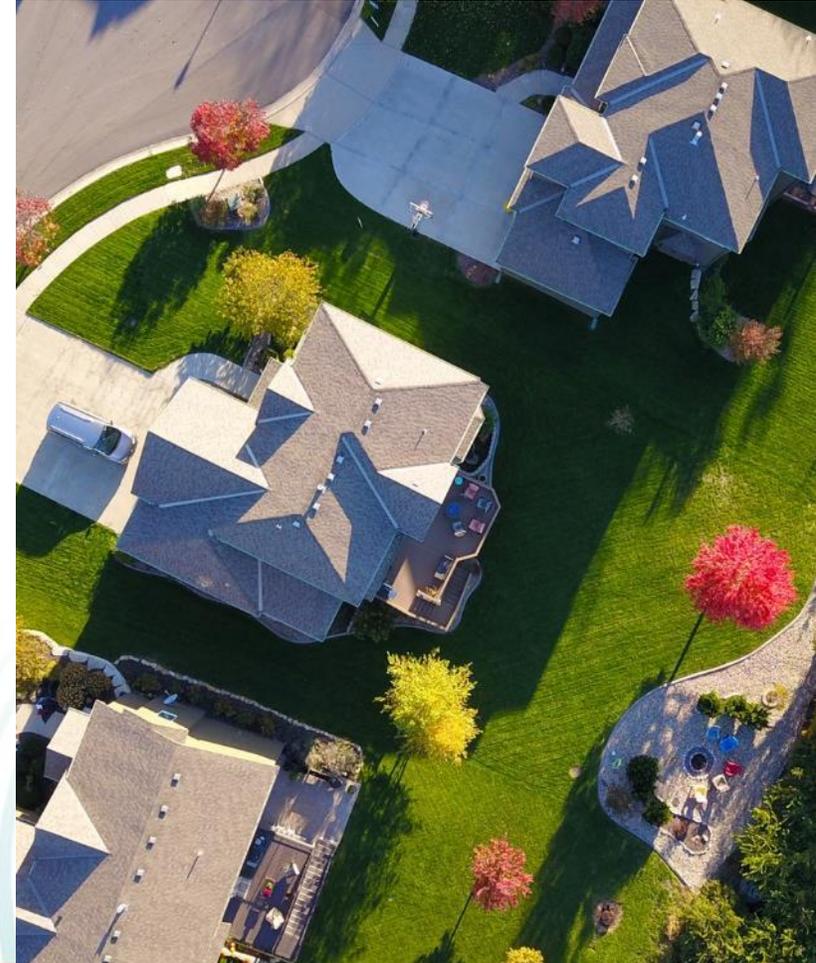


Why are we talking about Rating Data Files?

RESNET® Seeks to Improve HERS® Score Consistency

How? You ask....

- Quality Assurance Designee training
- Field ride-a-longs with QAD's
- Possibly standardizing the QA Review Deliverable (checklist)
- Clarifying Rater responsibilities in on-site verification protocols



What exactly is a QA review?

File Review aka 1/10 - 904.4.1.1 For each Rater, the Provider's QA Designee shall be responsible for an annual QA file review of the greater of one (1) home or ten percent (10%) of the Rater's annual total of homes for which Confirmed or Sampled Ratings were provided.

Field Review aka 1/100- 904.4.2.1 For each Rater, the Provider's QA Designee shall be responsible for an annual onsite QA field review of the greater of one (1) home or one percent (1%) of the Rater's annual total of homes for which confirmed or sampled ratings and diagnostic testing services were provided.

904.4.1.3.3 For of each Confirmed Rating, confirm that the values entered into the Rating Software for all Minimum Rated Features are supported by actual on-site field-verified test data;

QA is essentially asking you to **prove** the validity of your rating through documentation.



Definition-

From MINHERS Ch. 9 2014

- **Rating Data File** – The collection of information that makes up a file for Home Energy Ratings projected from plans or confirmed, including take-off forms, field data collection forms, energy simulation software files, RESNET Standard Disclosure Forms, rating certificates, rating reports, QA records (including findings and the resolution of any issues) as well as any documentation required by Third-Party Energy Efficiency Programs (EEP's) such as checklists, copies of labels or third-party certificates



a division of energyLogic

Rating Software File

AKA – Energy Simulation Software File

REM/RateTM

EnergyGauge[®]

Energy and Economic Analysis Software

ekotrope 



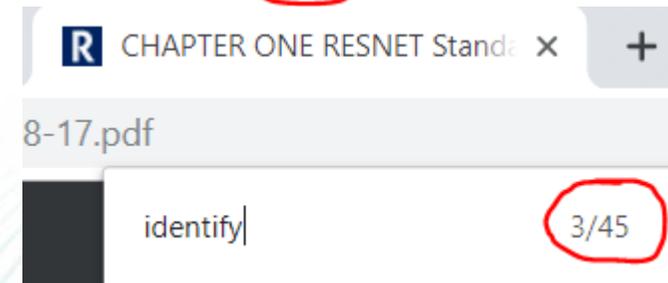
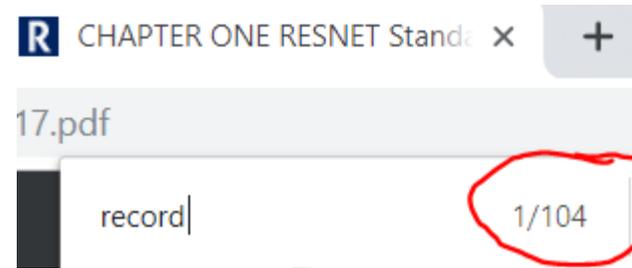
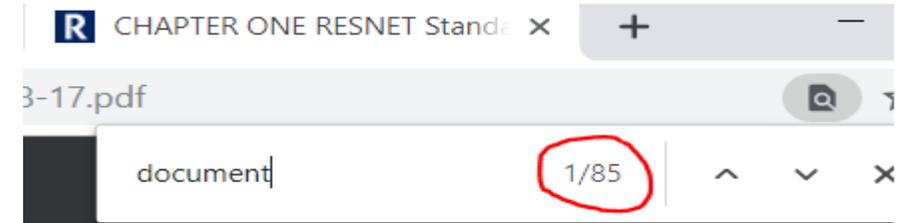
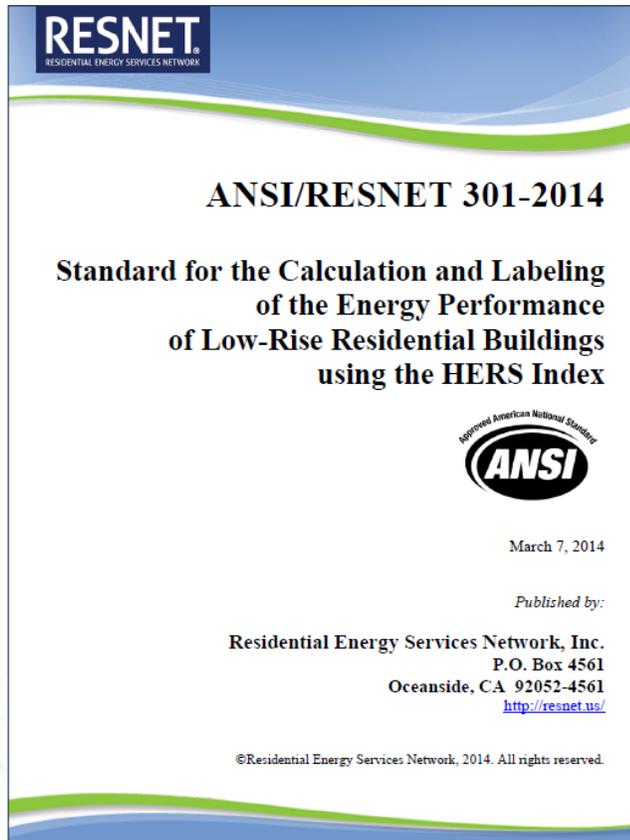
Site verified or RESNET Default?

4.5.1. Data Sources. If data for the Minimum Rated Features set forth in Section 4.5.2 cannot be obtained by observation or without destructive disassembly of the home, default values shall be used based on current and historical local building practice and building codes and for modular or manufactured housing available data from the manufacturer.

4.5.2. Standard Features. The Minimum Rated Features associated with the home shall be determined and documented by a Certified Rater or Approved Inspector in accordance with Sections 4.5.2.1 through 4.5.2.3 and the on-site inspection procedures in Appendix A and Appendix B



Hundreds of Data Points per Rating



Process Makes Perfect



RESNET
RESIDENTIAL ENERGY SERVICES NETWORK

ANSI/RESNET 301-2014

**Standard for the Calculation and Labeling
of the Energy Performance
of Low-Rise Residential Buildings
using the HERS Index**

ANSI
Approved American National Standard

March 7, 2014



Stay Organized!

Or mistakes can happen....



Data Collection Form as your Checklist

EnergyLogic Provider Services Rater Partner Data Collection Form									
General Info	Builder Name	Street Address	City	State	Rater at Rough	Date of Rough	Electric Utility	Gas Utility	Multifamily?
	Homeowner/Project Name	Lot/Unit/Building #	Foundation Type	Program/Code	Rater at Final	Date of Final	DASH ID	Number of Beds	Orientation
Building Shell	Thickness	Spacing (OC)	R-Value	Grade	Notes				
	Ambient Wall								
	Wall Type 2: Location >								
	Wall Type 3: Location >								
	Flat Ceiling								
	Vaulted Ceiling								
	Floor Type 1: Location >								
	Floor Type 2: Location >								
	Rim/Band Joist								
	Foundation Wall								
Slab									
Other									
Glazing	Window 1	Window 2		Basement Window		Slider		Skylight	
	U-Value	SHGC	U-Value	SHGC	U-Value	SHGC	U-Value	SHGC	U-Value/SHGC
Heating System	Type	Make	Model	AHRI#	Fuel Type	AFUE/HSPF	EAE	Output	
	Location								
	Type	Make	Model	AHRI#	Fuel Type	AFUE/HSPF	EAE	Output	
	Location								
Thermostat Type	Notes on Heating								
DHW	Type	Make	Model	AHRI	Fuel	EF	Tanks size		
	Location								
Distance to Furthest Fixture from DHW (ft)	Pipe Insulation > R3	2 GPM (faucet and shower)?	Recirc Type						
Air Conditioning	Type and Make	AHRI	SEER	Evaporator Make	Duct Insulation Supply				
	Condenser Model	Size	Evaporator Model	Duct Insulation Return					
	Type and Make	AHRI	SEER	Evaporator Make	Duct Insulation Supply				



Field Checklist

Rating ID #: HORIZON Model FRONT NORTH

Client: _____ DATE: 1/21/19 Version 9/26/05

House Address: 106 SOLEIL COURT Rating Type: CONF

City: _____ State: _____ Zip Code: _____ Year House Built: 2019

Phone: _____ Rater: AW

Elec Utility: _____ Acct#: _____ 12 Month Use: _____ 12 Month \$: _____

Gas Utility: _____ Acct#: _____ 12 Month Use: _____ 12 Month \$: _____

Occupant's signature authorizes rater to obtain a utility bill summary report from their utility provider, and releases next 2 years utility bill information for follow up verification of potential utility savings.

Signature: _____ Date: _____

House Type: Single Family Town House End Inside Apartment: End Inside Duplex Single Whole

Number of Bedrooms: 3 Number of Stories: 2 Lighting: Incandescent 100% CFL

Foundation Concrete Thickness: 8 Cond Space: Yes No Dryer: Gas Electric Propane

Basement: Structural Floor: Warm: Vented: N/A Range: Gas Electric Propane

Box: I-Type/R: 23 Thickness: 6 / FR B L Ceiling Fan: Yes No

Rim: I-Type/R: 23 Thickness: 6 / FR B L Energy Star: Fridge: Yes No Dishwasher: Yes No

Foundation Wall: Finished Unfinished I-Type R: 9+15 M# 62630-TRPT

Unconditioned Base: Ceiling I-Type R: NO BTU: _____ Gallons 50

Crawl Space: Warm Vented Wall Height: N/A Ins Side Pipes: Tank Wrap: Arm: Heat Trap:

Walls I-Type / R: _____ Ceiling I-Type / R: _____ H2O #2: Location: N/A Fuel: NG P E

Vapor Barrier: Installed Sealed None M# _____

Walkout / Framed Wall: I-Type / R: N/A Ins Side Pipes: Tank Wrap: Arm: Heat Trap:

Foam Sheathing: Y N I-Type/R: _____

Slab Edge: I-Type / R: _____ Slab Floor: I-Type / R: _____

Exterior Walls Siding Type: WOOD Color: L M D

2x4 I-Type/R: _____ F-Sheathing: Y N Type/R: _____

2x6 I-Type/R: 23 F-Sheathing: Y N Type/R: _____

Wall: I-Type/R: _____ F-Sheathing: Y N Type/R: _____

Cantilevers: I-Type/R: _____ F-Sheathing: Y N Type/R: NO

Party Walls: Wall: _____ I-Type/R: NO Cavity Depth: _____ F / R / B / L

Attics/Ceilings Roof Color: _____

Flat Attic 1: Ceiling Roof Line I-Type / R: _____

Flat Attic 2: Ceiling Roof Line I-Type / R: _____

Vaulted Attics: I-Type / R: _____ O / C _____

I-Type / R: _____ O / C _____

Knee Walls: I-Type / R: _____ Sheathing: Y N Type/R: _____

Garage Attached: Y N Location: L / R / B / F Bays _____

Common Wall: 23 I-Type/R: _____

Ceiling (to conditioned space) I-Type/R: 38 Cavity Depth: 12

H2O #1: Location: Basement Fuel: NG P E

Brand: State M# 62630-TRPT

EF/COP: _____

BTU: _____ Gallons 50

Ins Side Pipes: Tank Wrap: Arm: Heat Trap:

H2O #2: Location: N/A Fuel: NG P E

Brand: N/A M# _____

EF/COP: _____

BTU: _____ Gallons _____

Ins Side Pipes: Tank Wrap: Arm: Heat Trap:

HVAC #1: Location: Basement Zones: 1

Brand: Armanian M# Amss9620

Fuel: NG P E AFUE: 96

BTU in/out: 80 / _____ Programmable Thermostat: Y N

Supply Location: 95 / 5 _____ %

Return Location: _____ %

Duct Insulation R-Value: _____

Return Registers: 1 2 3 4 5 6 7 8 9

AC: Brand: NONE BTU: _____

Coil M#: _____ Ton: _____

Condenser M#: _____ Seer: _____

HVAC #2: Location: _____ Zones: _____

Brand: _____ M#: _____

Fuel: NG P E AFUE: _____

BTU in/out: _____ / _____ Programmable Thermostat: Y N

Supply Location: _____ / _____ %

Return Location: _____ / _____ %

Duct Insulation R-Value: _____

Return Registers: 1 2 3 4 5 6 7 8 9

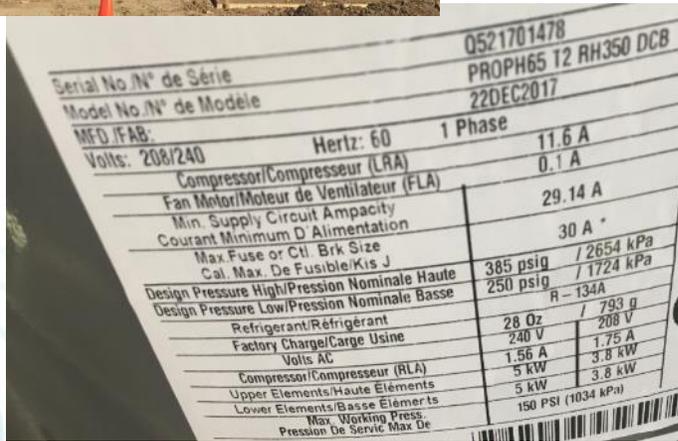
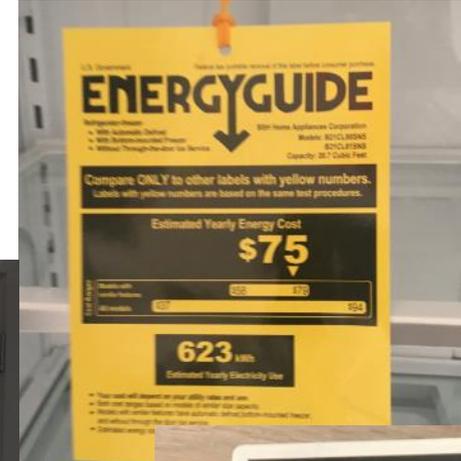
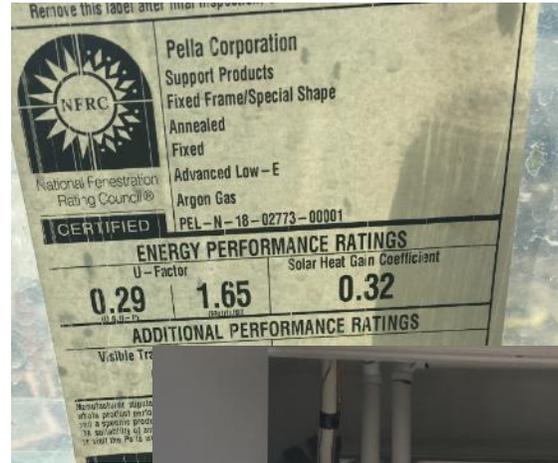
AC: Brand: _____ BTU: _____

Coil M#: _____ Ton: _____

Condenser M#: _____ Seer: _____



Streamline Photos



Cloud Based File Sharing

Even HERS rating specific options

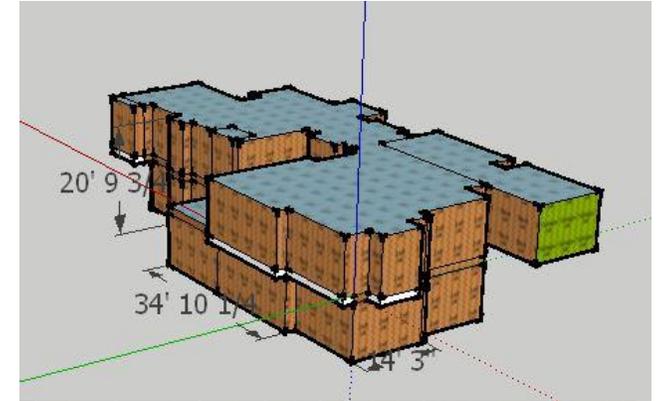
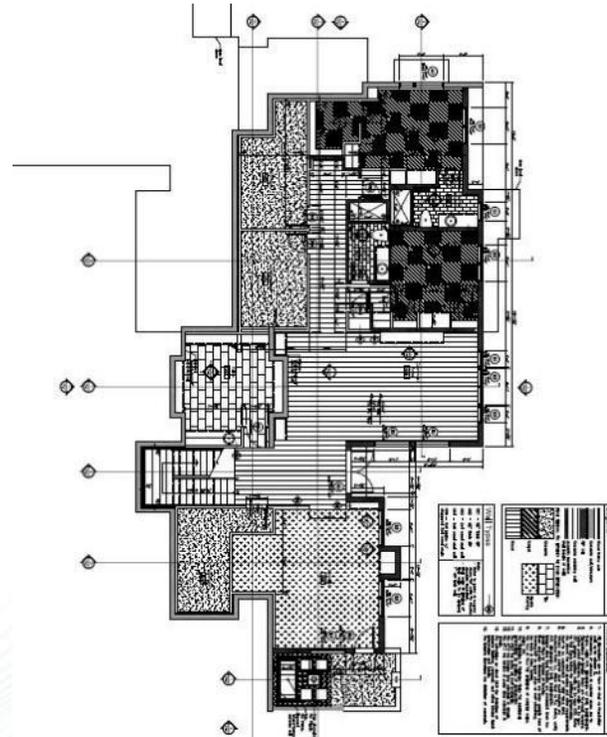


Google Drive



Rating Data File in Practice

- Ekotrope or REM file
- Plans and take-off
- Pre-drywall Data Collection Form
- Final DCF
- Spec list
- Cut sheets
- Photos



EnergyLogic Provider Services Rater Partner Data Collection Form									
Building Name	Street Address	City	State	Time in Project	Date of Input	Electric Load	Gas Load	Markings	
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Ideal QA Data files

- **Rating simulation file**

- Fully complete. Confirmed rating file
- All inputs verified
 - Where unable to be verified, defaults used
- Alternatively, where other assumptions made or special conditions exist, notes included in rating file notepad



Ideal QA Data files

- **Plans**

- Single-family
 - Typical architectural set sufficient
- Multifamily
 - Complete architectural set
 - MEP set may be helpful



Ideal QA Data files

- **Photos**

- Exterior of home – all 4 sides (and any unique/different construction features)
 - Verifying foundation conditions
 - Window locations, sizes, shading to match plans



Ideal QA Data files

- **Photos**

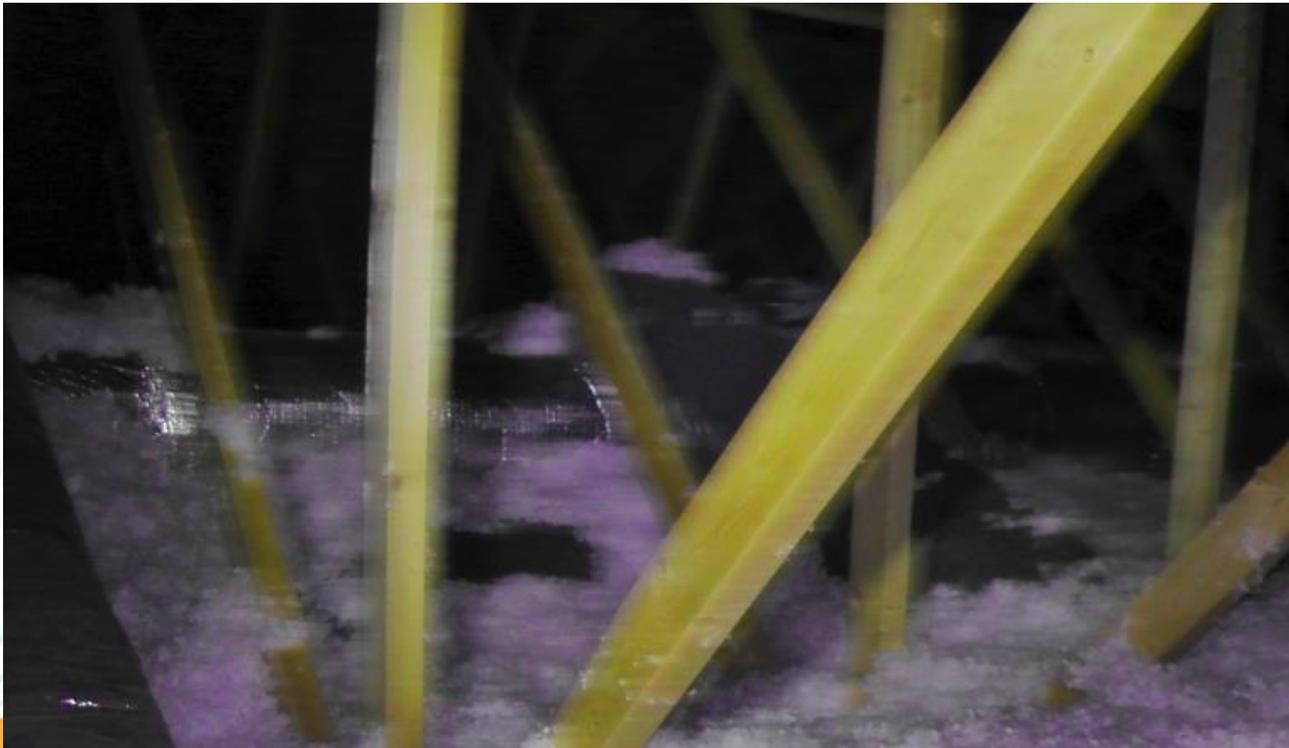
- Insulated assemblies



Ideal QA Data files

- **Photos**

- Duct conditions



Ideal QA Data files

- **Photos**

- Insulated assemblies



Ideal QA Data files

- **Photos**

- Insulated assemblies



Ideal QA Data files

- **Photos**

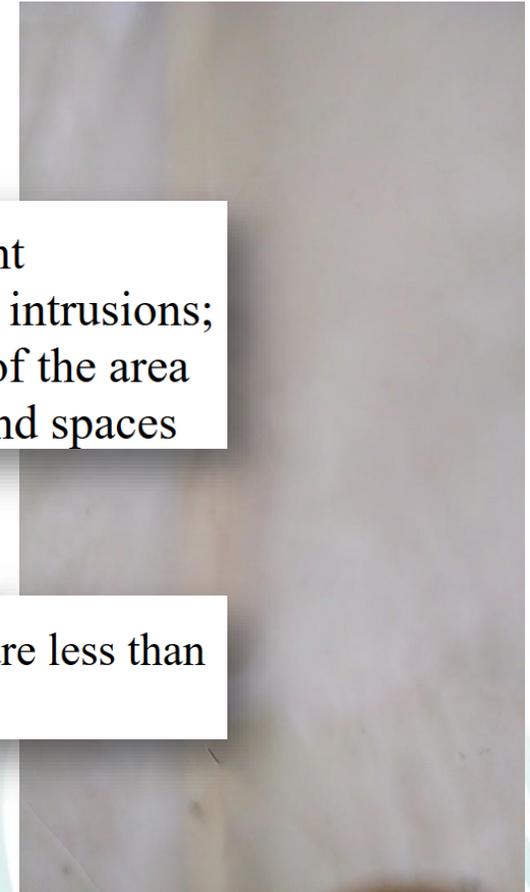
- Insulated assemblies



2. “Grade II” shall be used to describe an installation with moderate to frequent installation defects: gaps around wiring, electrical outlets, plumbing and other intrusions; rounded edges or “shoulders”; or incomplete fill amounting to less than 10% of the area with 70% or more of the intended thickness (i.e., 30% compressed); or gaps and spaces



Compression or incomplete fill amounting to 2% or less, if the empty spaces are less than 30% of the intended fill thickness, are acceptable for “Grade I”.



Ideal QA Data files

- **Photos**

- Equipment model #s
- AHRI certs
 - Combo of AC/furnaces
 - Eae entered correctly



Ideal QA Data files

Photos

All mechanical systems should be documented



Ideal QA Data files

- **Photos**

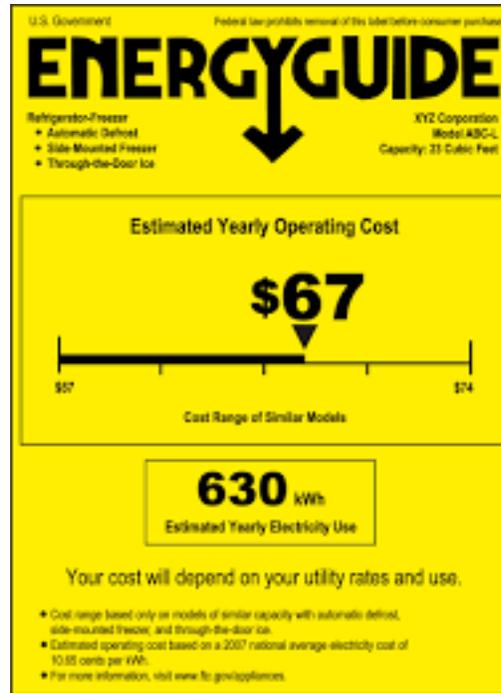
- Lights and appliances



Ideal QA Data files

Photos

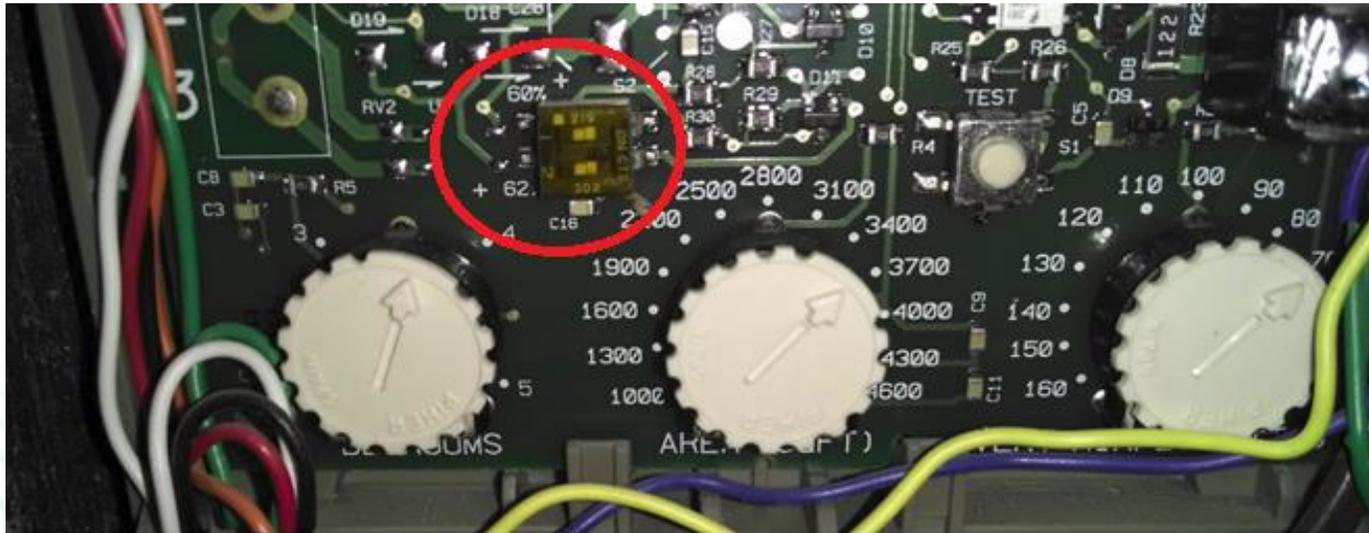
Lights and appliances



Ideal QA Data files

- Photos

- Mechanical ventilation – controls & runtime



Ideal QA Data files

- **Photos**

- Mechanical ventilation – ventilation air volume



Ideal QA Data files

- Photos

- Mechanical ventilation – wattage & efficiency

Energy Ratings

Full Report | More ▾ 4 Energy data points

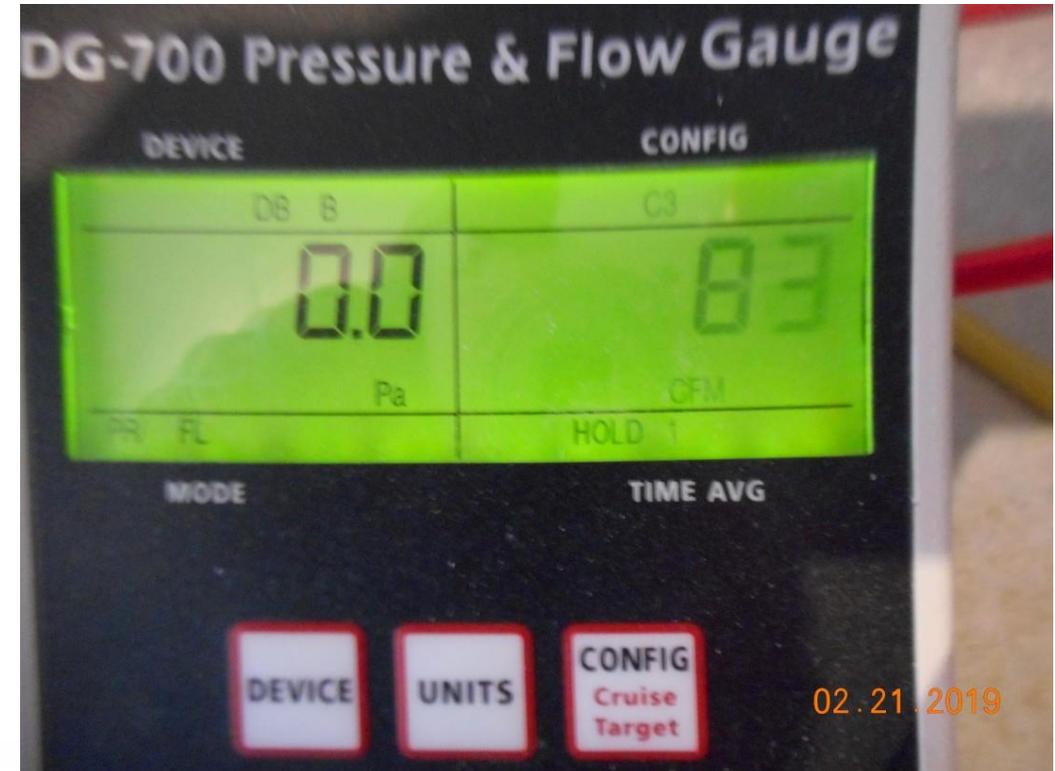
	Brand Name	Model	Temp Mode	°C	°F	Net Airflow (L/s)	Net Airflow (cfm)	Power Consumed (Watts)	SRE	ASRE
	Lifebreath	100ECM	HEATING	0	32	30	64	40	71	74
	Lifebreath	100ECM	HEATING	0	32	45	95	51	69	72
	Lifebreath	100ECM	HEATING	0	32	55	117	60	67	70
	Lifebreath	100ECM	HEATING	-25	-13	32	68	52	63	65



Ideal QA Data files

- **Photos**

- Testing photos



Ideal QA Data files

- Photos

General		
Rated Feature	Task	On-Site Inspection Protocol
Applies to relevant Minimum Rated Features (MRF) from Table 4.5.2(1)	Record field inspections and performance tests by digital/electronic means All records shall be kept for a minimum of 3 years	Clearly document the following: <ul style="list-style-type: none">- The date and time of the inspection/test- The name of the Certified Rater, Approved Inspector, or Approved Tester conducting the inspection/test- The Dwelling Unit being inspected/tested containing sufficient detail to indicate the location of the inspection, including the address or unit number of the inspected/tested Dwelling Unit- If included in the Energy Rating and present in the Dwelling Unit, a minimum of one representative photo of items #2 (Wall Assembly); #3 (Roof/Ceiling Assembly); and either #11 (Heating Equipment), #12 (Cooling Equipment), or #14 (Service Hot Water Equipment) from Table 4.5.2(1) that reflect the reported data- If testing is conducted in the Dwelling Unit, a photo of the recorded test results or a report generated by automated software that communicates with the testing device showing the test result Each photo and/or report shall be time/date stamped and geotagged.



Ideal QA Data files

• Checklists

- Rater completed checklists
- HVAC Design checklists

National Rater Design Review Checklist
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 09)

Home Address: _____ City: _____ State: _____ Permit Date: _____

1. Partnership Status

1.1 Rater has verified unless all equipment HVAC Contractor C

2. High-Performance

2.1 Specified level/rat

3.1 Specified ceiling, 3.1.1 Meets or exceeds Footnote A4, 3ACH50 in

3.1.2 Achieves Footnote A4, 3ACH50 in

4. Review of Nation

4.1 National HVAC Design Review Checklist

4.2 National HVAC Design Review Checklist

4.2.1 Cooling unit at exterior vertical surface of wall insulation in all climate zones, also at interior vertical surface of wall

4.2.2 Number of double-walls and all other exterior walls

4.2.3 Conditioned floor insulation in all climate zones and, if over unconditioned space, also including supports to ensure alignment. Alternatives in Footnotes 11 & 12.

4.2.4 Windows, doors, and other exterior walls

4.2.5 Predominant

4.2.6 Sealable, fill

4.2.7 The vent

4.2.8 Cooling size

Rater Name: _____

Rater Signature: _____

National Rater Field Checklist
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 09)

Home Address: _____ City: _____ State: _____

Thermal Enclosure System

1. High-Performance Fenestration & Insulation

1.1 Fenestration meets or exceeds specification in Item 2.1 of the National Rater Design Review Checklist

1.2 Insulation meets or exceeds specification in Item 3.1 of the National Rater Design Review Checklist

1.3 All insulation achieves Grade I install, per ANSI / RESNET / ICC Std. 301. Alternatives in Footnote 4.

2. Fully-Aligned Air Barriers At each insulated location below, a complete air barrier is provided that is fully aligned with the thermal boundary of the walls, ceiling, and floor.

2.1 Dropped ceilings / soffits below unconditioned attics, and all other ceilings

2.2 Walls behind showers, tubs, staircases, and fireplaces

2.3 Attic knee walls and skylight shaft walls

2.4 Walls adjoining porch roofs or garages

2.5 Double-walls and all other exterior walls

2.6 Floors above garages, floors above unconditioned basements or crawlspaces, and conditioned floors

2.7 All other floors adjoining unconditioned space (e.g., rim / band pads at exterior wall or at porch roof)

3. Reduced Thermal Bridging

3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the interior face of the exterior wall below and is ≥ R-21 in CZ 4-5; ≥ R-30 in CZ 6-8.

3.2 For slabs on grade in CZ 4-8, 100% of slab edge insulated to ≥ R-5 at the depth specified by the 2009 IECC and aligned with the thermal boundary of the walls.

3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8.

3.4 At above-grade walls separating conditioned from unconditioned space, one of the following options used:

3.4.1 Continuous rigid insulation, insulated siding, or combination of the two is used.

3.4.2 Structural Insulated Panels OR Insulated Concrete Forms OR Double-wall framing OR 12" Advanced framing, including all of the items below:

3.4.3a Corners insulated ≥ R-6 to edge.

3.4.3b Headers above windows & doors insulated ≥ R-3 for 2x4 framing or equivalent cavity width, and ≥ R-5 for all other assemblies (e.g., with 2x6 framing).

3.4.3c Framing limited at all windows & doors to one pair of king studs, plus one pair of jack studs per window opening to support the header and sill.

3.4.3d Interior / exterior wall intersections insulated to same R-value as rest of exterior wall.

3.4.3e Minimum stud spacing of 16 in. o.c. for 2x4 framing in all Climate Zones and, in CZ 6-8, 24 in. o.c. for 2x6 framing.

4. Air Sealing (Unless otherwise noted below, "sealed" indicates the use of caulk, foam, or equivalent material.)

4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed with backings / flashings as needed.

4.2 Recessed lighting fixtures adjacent to unconditioned space (ICAT labeled and gasketed). Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to ≥ R-10 in CZ 4-8.

4.3 Above-grade sill plates adjacent to conditioned space (sealed to foundation or sub-floor). Gaskets also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to cond. space.

4.4 Continuous top plate or backing is at top of walls adjoining unconditioned space, and sealed with backings / flashings as needed.

4.5 Drywall sealed to top plate of unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.

4.6 Rough opening around windows & exterior doors sealed.

4.7 Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls.

4.8 In multifamily buildings, the gap between the common wall (e.g. the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries.

4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket.

4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable ≥ R-10 cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated.

Revised 09/01/2019

National HVAC Design Report 1
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 09)

HVAC Designer Responsibilities:

- Complete one National HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with different configurations (i.e., different elevations, options, and/or orientations). Visit www.energystar.gov/whomtohire/design and see Footnote 2 for more information.
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rates) from the builder or Home Energy Rater.
- Provide the completed National HVAC Design Report to the builder or credentialed HVAC contractor and to the Home Energy Rater.

National HVAC Commissioning Checklist 1, 2
ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 09)

HVAC Commissioning Contractor Responsibilities:

- The commissioning contractor must be credentialed by an HVAC oversight organization to complete this checklist. One checklist must be completed and signed by the commissioning contractor for each HVAC system that is commissioned.
- The completed checklist for each commissioned system, along with the corresponding National HVAC Design Report, shall be retained by the contractor for a minimum of three years for quality assurance purposes. Furthermore, the contractor shall provide the completed checklist to the builder, the Home Energy Rater responsible for certifying the home, and the HVAC oversight organization upon request.
- Visit www.energystar.gov/newhvac for information about the credential requirement and this checklist.

1. Contractor name: _____ Contractor company: _____ Date: _____

2. Organization that your company is credentialed with: ACCA Advanced Energy NYSERDA

3. Builder client name: _____ City: _____ State: _____ Zip code: _____

4. Home address: _____ City: _____ State: _____ Zip code: _____

5. National HVAC Design Report corresponding to this system has been collected from designer or builder. Contractor-verified

6. Area that system serves, per Item 1.4 of National HVAC Design Report: Whole-house Lower-level Other _____

7. House plan, per Item 1.6 of National HVAC Design Report: Site-specific design Group design # _____

8. Return-air filter: _____

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Revised 09/01/2019



Ideal QA Data files

- **QA forms**

- There is no standardized RESNET QA form that must be used
- Providers have ability to create their own forms
- Old template circa 6+ years ago
- ENERGY STAR maintains QA checklist that should be used for all ENERGY STAR 1% QAs

THE BER BUILDING EFFICIENCY RESOURCES RESNET QA CHECKLIST

QA Audit Information					
QA/QADD Name	Brent Thumma	Additional QA Reviewer	Chris McTaggart	QA Type (1%, 10%, Other)	1%
Review date	3/22/2017	Email	bthumma@theber.com	Phone	800-399-9620
Rater Information					
Rater name	Will Jones	Rater Number	1882688	Company/Organization	TN Pro Inspections
HERS Provider	Building Efficiency Resources	Email	wj@tnproinspections.com	Phone	615-564-0074
Project Information					
REM file name	1% QA 0043-0028-C1_Woodbine_Community_Org_71	Project Address	710 26th Avenue North		
Builder	Woodbine Community Org.	Plan Name	7 Bedroom 2016	Rating Date	01/26/17
1% QA comparison		Pre-QA HERS Index	74	Pre-QA Design Heating Load	36.8
Post-QA Change in EEP/ Tax Credit compliance?		Post-QA HERS Index	74	Post-QA Design Heating Load	36
				Pre-QA Design Cooling Load	24
				Post-QA Design Cooling Load	24.6
Summary of Findings					
3-22-17 BT Comments: Water heater was modeled incorrectly please use modeling tool for commercial water heating in REMrate file.					
Corrective Action Required? <input checked="" type="radio"/> Yes <input type="radio"/> No					
Action Items					
Rating Documentation for Review		Present	Comments	Rating Documentation for Review	
REM/Rate .big file		Y		Photographs - insulation, mechanicals, etc.	Y
Architectural Plans / Field Take-offs		Y		Photographs - exterior of house	Y
Initial project specifications		Y		Photographs - manometer readings	Y
Rough Inspection Report		Y		Program Requirements	Y
Final Inspection Report		Y		- EEP Inspection Checklists completed	
RESNET Disclosure		N		- Manual J Load Calculations	
AHRI certificates		N		- Other	
Significant Rating Discrepancies				Y/N	Comments
Two or more of the following features is incorrect: Property Address, Builder Info, Rating Organization Info, RTIN, Provider ID, Rating Type.				N	
Foundation type incorrect				N	
Floors on or above grade incorrect				N	
Number of bedrooms is incorrect				N	
Modeled Climate Location is not best choice available				N	
Total CFA, volume, foundation wall, AGW, slab, framed floor, window or ceiling area appears to be incorrect by greater than 10%.				N	There was some issues but nothing over 10%
Any assembly type greater than 100 sqft either erroneously added or omitted from the model				N	
More than 2 entries located inaccurately				N	
Window overhang properties inaccurately entered on 3 or more windows by 1' or greater for any overhang entry.				N	
Window adjacent shading properties inaccurately entered on 3 or more windows by one increment or greater				N	
3 or more window entries oriented inaccurately				N	



About energyLogic

Berthoud, Colorado-based EnergyLogic is a software and building consulting company that has provided expert resources, education and support to new home builders and energy raters involved in the construction of high-performance homes since 2006.



Presenter Info

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Chris McTaggart

Principal & HERS Provider Manager at The BER

