

# RESNET HOME ENERGY RATING Standard Disclosure

For home(s) located at: 404-2 } 404-3 } 404 Piedmont St

City: Blacksburg State: VA 24060

Check the applicable disclosure(s) in accordance with the instructions on the reverse of this page:

1.  The Rater or the Rater's employer is receiving a fee for providing the rating on this home.
2.  In addition to the rating, the Rater or Rater's employer has also provided the following consulting services for this home:
  - A. Mechanical system design
  - B. Moisture control or indoor air quality consulting
  - C. Performance testing and/or commissioning other than required for the rating itself
  - D. Training for sales or construction personnel
  - E. Other (specify)

3.  The Rater or Rater's employer is:
  - A. The seller of this home or their agent
  - B. The mortgagor for some portion of the financed payments on this home
  - C. An employee, contractor or consultant of the electric and/or natural gas utility serving this home

4.  The Rater or Rater's employer is a supplier or installer of products, which may include:
 

	<b>Installed in this home by:</b>		<b>OR Is in the business of:</b>	
HVAC systems.....	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Thermal insulation systems .....	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Air sealing of envelope or duct systems .....	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Windows or window shading systems.....	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Energy efficient appliances.....	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Construction (builder, developer, construction contractor, etc)	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer
Other (specify): _____	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer	<input type="checkbox"/> Rater	<input type="checkbox"/> Employer

This home may have been verified under the provisions of Chapter 6, Section 603 "Technical Requirements for Sampling" of the Mortgage Industry National Home Energy Rating Standard as set forth by the Residential Energy Services Network (RESNET).

Rater's Printed Name Stephen Gregory

9009  
Certification #

Rater's Signature Stephen P Gregory

7/10/09  
Date

I attest that the above information is true and correct to the best of my knowledge. As a Rater or Rating Provider I abide by the rating quality control provisions of the Mortgage Industry National Home Energy Rating Standard as set forth by the Residential Energy Services Network (RESNET). The national rating quality control provisions of the rating standard are contained in Chapter One 4.C.8. of the standard and are posted at <http://www.natresnet.org/accred/standards.pdf>

**The Home Energy Rating Standard Disclosure for this home is available from the rating provider.**

Builder *James [Signature]*

TA Step PG  
Final Inspection 7/13/09

Date: 3/17/09  
3/27/09



**Pre-Sheetrock Inspection / Re-inspection** 3/31/09

Project: 396-Piedmont - Lot 1 & Lot 2

Technician: Steve Gregory  
 Phone: 540-250-6443  
 Asst. Tech: \_\_\_\_\_  
 ECH FAX: 804/343-1043

Builder Name: HIGHLANDER CONSTRUCTION  
 Phone: 540-239-1396 (C)  
 Builder Signature: \_\_\_\_\_ NOT Available  
 Builder Fax: 540-382-0825

Development name: \_\_\_\_\_ Total conditioned space: 1980

Building / Unit: 404 Piedmont St Blacksburg VA

Builder / trade present: Y/N Plans: Y/N Load Calculations: Y/N

**1. AIR SEALING and INSULATION**

Y	N	N/A	
✓			1 Attic kneewalls sheathed, encapsulated and insulated to R-19
✓			2 Joist cavities under kneewalls blocked
✓			3 Stud cavities blocked from attic
✓			4 Attic subfloor limited or raised
✓			5 Porch roof sealed at exterior wall
✓			6 Cantilevered floors and dropped ceilings sealed
✓			7 Insulation in contact with cantilevered floors
✓			8 Floors over garage sealed
✓			9 Insulation in permanent contact with subfloor over garage
✓			10 Ceiling/subfloor insulation quality I <input checked="" type="checkbox"/> , II <input type="checkbox"/> , III <input type="checkbox"/>
✓			11 Recessed can lights air-tight and sealed
✓			12 Airtight hatch for attic access panel and pull down stairs
✓			13 Insulated hatch for attic access panel & pull down stairs
✓			14 Airtight, insulated hatch installed for whole-house fan
✓			15 Roof vented properly with solid baffles
✓			16 Staircase framing at exterior wall/attic sealed & insulated
✓			17 Air barrier in continuous contact with insulation
✓			18 Wall insulation quality I <input checked="" type="checkbox"/> , II <input type="checkbox"/> , III <input type="checkbox"/>
✓			19 Chases capped and sealed
✓			20 Exterior walls of fireplace chase insulated
✓			21 Top and bottom plate penetrations sealed
✓			22 Bottom plate sealed to floor
✓			23 Penetrations in wall sheathing sealed
✓			24 Gaps in sheathing (>1/8") sealed
✓			25 Window and door rough openings sealed
✓			26 Exhaust fan penetration sealed
✓			27 Floor penetrations sealed
✓			28 Shower and tub drains sealed
✓			29 Sheathing installed behind tubs/showers
✓			30 Insulation installed on bath and tub exterior walls
✓			31 HVAC boots in insulated floors sealed
✓			32 Basement walls insulated properly
✓			33 Common walls between units completely sealed

**2. HEATING AND COOLING SYSTEMS**

Y	N	N/A	
✓			34 Air handler properly sized
✓			35 Joints and seams sealed with mastic
✓			36 >6" between ducts and A/H and end caps
✓			37 Ducts supported every 5'
✓			38 Flex ducts free of pinches
		✓	39 Sharp turns use metal elbows
✓			40 No ducts in panned joists/studs/cabinets
✓			41 No ducts in insulated cavities

3. WINDOWS		Windows	Doors	Skylights
SHGC		.30		
U Value		.35		

**4. MOISTURE MANAGEMENT AND IAQ**

Y	N	
✓		All fireplaces have flues and inlets
✓		5% grade or better around building
✓		Bathroom exhaust vented to exterior
✓		No poly in walls

**AIR HANDLER EFFICIENCY**

Area served: 946 / 1034 Total 1980 sf

Manufacturer: HEIL

Indoor Model Number: FSM4X18

Outdoor Model Number: H4 #318

SEER: 13

**HOT WATER HEATER**

Manufacturer: Rinnai R941S

Model Number: (REV-VA 2535FFWD-UC)

Capacity: TANKLESS (C) gallons

Items on the list are required for certification unless otherwise noted and will improve the overall quality of the building. However, if all items listed are completed this does not guarantee the building will qualify for certification



# EarthCraft House Virginia Testing Sheet

3117  
 Date: 3/31/09

Inspector: Steve Gregory Address: Piedmont St Blackburg VA

Builder: Highlander Construction (396) Worksheet Score: \_\_\_\_\_

Community: \_\_\_\_\_ HERS Score or BOP #: 79

Lot: 1 & Lot 2 RADON VENT: Yes  No

**Blower Door equations:**  
 Open:  $490.2x(Pa)^{.4945}$   
 Ring A:  $180.7x(Pa)^{.4948}$   
 Ring B:  $57.2x(Pa)^{.5065}$   
 Note:  $\sqrt{Pa}$  is an acceptable approximation

**Duct Blaster Equations:**  
 Ring 3:  $6.33x\sqrt{Pa}$   
 Ring 2:  $15.8x\sqrt{Pa}$   
 Ring 1:  $41.42x\sqrt{Pa}$   
 Open:  $108.5x\sqrt{Pa}$

Floor: 1375  
 Walls: 2912  
 Ceiling: 1034  
 SFBE: 4802  
 band 162  
 SFBE 5054

SFBE: 5054 Leakage Goals:  $0.40 * SFBE =$  2021  $0.25 * SFBE =$  1264

## Blower Door Test

NOTES:

Date	Pa. Outside	Ring	Fan Pressure	Fan Flow or CFM50	CFM50 /SFBE
lot 1 404-2 7/13		A	50	1040	
lot 2 404-3		A	50	970	

## Duct Blaster Test

1<sup>st</sup> Air Handler Location: \_\_\_\_\_ Floor served: 1<sup>st</sup>  
 Area: 946 ft<sup>2</sup> Leakage Goal (<6%): 51 (5%) 47 4% 39  
 Fresh Air Intake  Wrong flapper on wall cap  (Semi) conditioned space?

Date	Duct/ Outside Pa	Ring	DB Fan Pressure	DB Fan Flow Total /out	% Leakage
lot 1 404-2 7/13		2		<del>88</del>	
lot 1 404-2		2		88 / 39	9/4%
lot 1 404-3 7/13		2		<del>89</del> / 30	

NOTES:  
 Ducts in Cond. crawlspace - with kitchen duct sealed

2<sup>nd</sup> Air Handler Location: Attic Floor served: 2<sup>nd</sup>  
 Area: 1051 ft<sup>2</sup> Leakage Goal (6%): 62 5% 52  
 Fresh Air Intake  Wrong flapper on wall cap  (Semi) conditioned space?

Date	Duct/ Outside Pa	Ring	DB Fan Pressure	DB Fan Flow	% Leakage
lot 1 404-2				<del>107</del> / 190	
lot 1 404-2				73 / 50	7 / 4%

NOTES:  
 Ducts in Attic - unconditioned  
 Not able to test at PDW1

61 / 50 5.8 / 4.8



# EarthCraft House™

Sensibly Built for the Environment

## NORTHERN MIXED HUMID CLIMATE WORKSHEET

IECC 2004 Climate Zone 4

A completed worksheet must be submitted to EarthCraft House for each home to be certified. An EarthCraft House certification requires a minimum of 150 points. Point requirements for each Tier are listed below and throughout the worksheet. In addition to having a completed worksheet, each home must also have appropriate documentation, ENERGY STAR certification and Pre-drywall and Final Inspections by an EarthCraft House Inspector.

EarthCraft House (I)	150 points
EarthCraft House Select (II)	200 points
EarthCraft House Premium (III)	230 points

Worksheets may be submitted via mail, fax, email or presented on-site to the inspector.

Mail: EarthCraft Virginia  
 1840 W. Broad St., Suite 200  
 Richmond, VA 23220  
 Fax: (804) 343-1043  
 Email: [admin@earthcraftvirginia.org](mailto:admin@earthcraftvirginia.org)

Builder Group: Highlander Construction  
 Contact Person: James Oliver  
 Phone: 540-382-0824 (a) 540-239-1396 (c)  
 Fax: 540-382-0825  
 Email: oliverj@highlanderconstruction.com  
 House Address: 404-2 & 404-3 Piedmont St  
 Lot #: \_\_\_\_\_  
 Community: Blacksburg Blacksburg VA

**Builder** - By accepting the EarthCraft House certification, I pledge that this house has been constructed to the standards listed on this Scoring Worksheet.

James Oliver 7/13/09  
 Builder Signature date

**Home Buyer** - I have reviewed the EarthCraft House measures with the homebuilder or sales agent.

\_\_\_\_\_  
 Home Buyer Signature (required only for pre-sales) date

**EarthCraft House Inspector**

Steve Gregory 7/13/09  
 Inspector Signature date

Worksheet Score 177

FINAL - 183  
 SCORE

1 - SITE PLANNING		Points	SCORE	DOCUMENTATION
1	REQUIRED: Must comply with all federal, state, and local government erosion control and tree protection measures.	-		
2	REQUIRED: workshop on erosion and sediment control	-		certificate
3	erosion control site plan	1	1 ✓	site plan
4	excavated topsoil protected from erosion	2	2 ✓	
5	use of redundant mulch, compost, or straw bales for erosion control	3		
6	permanent storm water control	2	2 ✓	site plan
7	grind stumps and limbs for mulch	2		
8	mill cleared logs	2		
9	remove invasive plants from site	1		
10	tree preservation plan	3		tree plan
11	tree planting (min 12 trees per acre of developed land; min 2" caliper)	4		
12	protected tree save area	2		site plan
13	utilities in tree root zones tunneled or hand dug (1 point per tree, max 5 trees)	1 per tree		
14	individual trees fenced at drip line (1 point per tree, max 5 trees)	1 per tree		
15	registered Building With Trees (NAHB Program) development	5		confirmation letter
16	protected green space (min 25% of lot or 40% of development)	1	+	site plan
17	protected green space (min 40% of lot or 60% of development)	2		site plan
18	certified wildlife habitat (development or lot)	2		certificate
19	lot size ≤1/5 acre	1		site plan
20	lot size ≤1/10 acre	3		site plan
21	lot size ≤1/15 acre	5		site plan
<b>SITE PLANNING TOTAL</b>			<b>5</b>	
<b>Builder must earn a minimum for: tier I - 4 pts., tier II - 6 pts., tier III - 8 pts.</b>				
2 - ENERGY EFFICIENT BUILDING ENVELOPE AND SYSTEMS		Points	SCORE	DOCUMENTATION
1	REQUIRED: ENERGY STAR HOME CERTIFICATION. Note: Homes with all items marked ★ will likely qualify as ENERGY STAR Homes using a Builder Option Package. See www.energystar.gov.			
2	REQUIRED: IECC 2006 plus applicable state ammendments			
2A - REQUIRED AIR SEALING MEASURES		Points	SCORE	DOCUMENTATION
1	penetrations through top and bottom plate sealed	-	✓	
2	bottom plate sealed to floor or foundation	-	✓	
3	penetrations through insulated subfloor sealed	-	✓	
4	seal all HVAC boots to subfloor or drywall (including ceiling)	-	✓	
5	shower and tub drains sealed	-	✓	
6	cantilevered floor sealed above supporting wall	-	✓	
7	window and door rough openings sealed	-	✓	
8	gaps in exterior wall sheathing sealed	-	✓	
9	sheathing penetrations sealed (including exterior light fixtures)	-	✓	
10	exterior walls of fireplace chase sealed and behind exterior tubs sealed	-	✓	
11	penetrations through drywall in attached garage sealed	-	✓	
12	air barrier installed behind tubs and showers on insulated walls	-	✓	
13	no polyethylene shall be used on exterior walls or foundation walls	-	✓	
14	all chases in contact with building envelope have air barrier applied to the interior of the chase where it meets the building envelope	-	✓	
15	penetrations through band sealed (including bathroom exhaust fan)	-	✓	
16	whole house fan must include cover that is gasketed to framing assembly	-	✓	
17	all recessed can lights in insulated ceilings must be airtight and IC-rated	-	✓	
18	penetrations through insulated ceiling sealed	-	✓	
19	attic pull-down stairs, scuttle hole, & kneewall doors sealed at rough opening	-	✓	
20	attic kneewall doors & scuttle holes weather-stripped	-	✓	
21	chases sealed and insulated	-	✓	
22	stud cavities blocked at change in ceiling height	-	✓	
23	attic kneewall has sealed attic-side, rigid sheathing	-	✓	
24	joist cavities under attic kneewall blocked	-	✓	
2B - ADDITIONAL AIR SEALING MEASURES		Points	SCORE	DOCUMENTATION
1	drywall penetrations in insulated walls sealed	1	1 ✓	
2	seams in band joist between conditioned floors sealed	2	2 ✓	
3	housewrap installed with all seams and edges taped	1	1 ✓	
4	ceiling drywall sealed to top plate	2	2 ✓	
5	attic access with sealed attic-side cover or attic access outside of building envelope	2	2 ✓	
6	if vaulted ceiling, blocking installed with baffles to prevent air washing through insulation or use foam insulation or dense pack cellulose	4	4 ✓	
<b>2C - BLOWER DOOR TEST</b>			<b>12</b>	
1	REQUIRED: Blower door test result <0.50 cfm <sub>50</sub> / square foot of building envelope	-		test results
2	test result <0.4 cfm <sub>50</sub> / square foot of building envelope	25	25	test results
3 ★	test result <0.25 cfm <sub>50</sub> / square foot of building envelope (fresh air ventilation required)	35	35	test results
<b>AIR SEALING SUBTOTAL</b>			<b>35</b>	

		Points	SCORE	DOCUMENTATION
<b>2D - REQUIRED INSULATION</b>				
1	slab insulation R10	-		
2	foundation walls R10 continuous or R13 cavity (if basement/crawl is inside building envelope)	-		
3	framed floors R19 (if basement/crawl is outside building envelope) with insulation in contact with subfloor	-		
4	cantilevered floors R19 (blocking between joists required)	-		
5	exterior walls & band joist R13	-		
6	insulated sheathing R3 on metal framed exterior walls (thermal break)	-		
7	for fireplace chase(s) on exterior wall, fireplace chase must have solid air barrier to interior of chase	-		
8	flat ceilings R38 (requires baffles and blocking in vented attics)	-		
9	sloped ceilings R30 (or R20 spray foam) (Note: BOP requires R30)	-		
10	attic kneewalls R19 insulation & attic side air barrier	-		
11	attic pull-down or scuttle hole R5 (compressed batt not acceptable)	-		
12	whole house fan must include sealed, min R5 insulated cover	-		
<b>2E - ADDITIONAL INSULATION</b>				
1	insulation installation quality Grade II based on RESNET standard	(required tier II)	1	
2	★ insulation installation quality Grade I based on RESNET standard	(required tier III)	5	5 ✓
3	foundation walls insulated instead of floor over basement (no paper faced batts)		5	
4	foundation walls insulated with continuous insulation	(required tier III)	2	2
5	sealed, insulated crawlspace walls R8		4	40
6	install a minimum of R3 continuous insulation on underside of framed floors over unconditioned spaces		2	
7	no fireplaces on exterior walls		1	
8	cantilevered floors R30 (blocking between joists required)		1	1 ✓
9	band joist insulated R19		2	
10	spray applied wall insulation		5	5 ✓
11	insulated wall stud cavities R15		1	1
12	wall insulation without vapor retarder		2	2 ✓
13	insulated headers	?	1	1
14	2-stud corners with drywall clips or alternative framing	?	1	1
15	T-walls or alternative framing for insulation coverage improvements in wall field	?	1	1
16	insulated wall sheathing R 2.5 or greater (min. 75%)		2	
17	insulated wall sheathing R 5 or greater (min. 75%)		3	
18	insulated wall sheathing R 2.5 or greater (100%)		4	
19	insulated wall sheathing R 5 or greater (100%)		5	
20	ICF or SIP for complete building envelope walls (minimum R13)		2	
21	loose-fill attic insulation card and rulers		1	1 ✓
22	attic insulation extended over wall cavity (energy heel trusses or raised top plate)		2	
23	vaulted and tray ceilings R38	(required tier III)	1	1 ✓
24	attic radiant barrier		2	
25	attic kneewall doors R8	(required tiers II & III)	2	
26	attic pull-down or scuttle hole R19 (compressed batt not acceptable)		3	3 ✓
27	2x6 attic kneewalls with R19 cavity insulation & R3 insulating sheathing (U=0.051)	(required tier III)	3	
28	2x4 attic kneewalls with R13 cavity insulation & R5 insulating sheathing (U=0.058)	(required tier III)	3	
29	complete roofline spray insulation or SIP roof with code-approved air barrier (minimum R20)		2	
<b>INSULATION SUBTOTAL</b>			<b>25</b>	
<b>2F - WINDOWS</b>				
1	REQUIRED: Maximum window U-factor 0.40, SHGC 0.45		-	window label
2	REQUIRED: windows are NFRC certified with label (0.75% WFA exemption)		-	window label
3	★ window U-factor < 0.40		2	2 ✓ window label
4	window U-factor < 0.35	(required tiers II & III)	5	5 window label
5	glass door U-factor < 0.40		1	1 ✓ window label
6	skylight U-factor < 0.60		1	1 window label
7	★ window, skylight and glass door SHGC < 0.40	(required tiers II & III)	3	3 ✓ window label
8	window, skylight and glass door SHGC < 0.35		5	5 ✓ window label
9	1.5-foot overhangs over 80% of windows (max 2 feet above windows)		1	
10	solar shade screens (min all east and west windows)		3	
11	west facing glazing less than 2% of floor area		2	house plan
12	east facing glazing less than 3% of floor area		2	house plan
13	certified passive solar design (25% load reduction)		10	computer print-out
<b>WINDOWS SUBTOTAL</b>			<b>8</b>	
<b>2G - ROOF</b>				
1	ENERGY STAR roof over minimum 75% of total roof area		5	label
<b>ROOF SUBTOTAL</b>				

		Points	SCORE	DOCUMENTATION
<b>2H - HEATING AND COOLING EQUIPMENT</b>				
1	REQUIRED: Manual J calculation for sizing heating and cooling equipment based on actual house orientation	-		load calc
2	REQUIRED: Installed cooling equipment and/or heatpump oversized by no more than 15% of Manual J (all units)	-		load calc + eqmt size
3	REQUIRED: adaptive recovery for programmable thermostat(s) when programmable thermostat(s) is used with heat pump(s)	-		product literature
4	REQUIRED: No electric resistance heat as primary heat source for any portion of conditioned space	-		
5	REQUIRED: Indoor and outdoor coils matched	-		ARI or manufacturer's certificate
6	installed heating equipment within 25% of Manual J (all units)	2		load calc + eqmt size
7 ★	90% AFUE furnaces or 8.5 HSPF heat pumps (required tiers II & III)	6		energy guide label
8	meets sensible and latent heat loads (all air conditioners)	2		spec sheet
9 ★	SEER 14 cooling equipment (required tier III)	4	4	energy guide label
10	SEER 16 cooling equipment	6		energy guide label
11	dual-stage compressor cooling equipment	3		
12	variable speed blower	2	2 ✓	
13	geothermal heat pump	8		
14 ★	ENERGY STAR certified programmable thermostat (all systems) (required tier III)	1	1 ✓	product literature
15	outdoor thermostat for heat pumps	1	1 ✓	
16	cooling equipment has non-CFC and non-HCFC refrigerant (e.g. R-410A)	3	3 ✓	product literature
17	zone control with wired dampers - one system serves multiple zones	3		
18	if zoned control, zoned returns or transfer grills between zones (required tier III)	1		
19	verification of proper refrigerant charge (required tier II & III)	5	5	test results
<b>HEATING AND COOLING SUBTOTAL</b>			15	
<b>2I - DUCTWORK / AIR HANDLER</b>				
1	REQUIRED: air handlers & duct systems sealed with mastic or mastic tape	-		
2	REQUIRED: code approved solid connector for all flex to flex connections	-		
3	REQUIRED: all supply and return ducts fully ducted with code approved materials (no panned joists or stud cavities)	-		
4	REQUIRED: supply and return duct work insulated to R8 outside of conditioned space	-		
5	all return ducts fully ducted with code approved materials (no panned joists) (required tiers II & III)	1	1 ✓	
6	air handler located within conditioned space (all units)	5		
7	ducts located within conditioned space (min 90%)	5		
8	installed duct design complies with Manual D on a room-by-room basis	5		sizing calculation
9	return plenum duct take-off free area is 120% of supply plenum duct take-off free area (requirement waived if installed per Manual D) (required tier III)	3	3 ✓	
10	all supply duct take-offs spaced at least 6" apart (no ducts from cap) (required tier III)	2	2 ✓	
11	no duct take-offs within 6" of supply plenum cap (required tier III)	1	1 ✓	
12	rigid ductwork or all flex duct pulled tight with no pinches (required tier III)	1	1 ✓	
13	no ducts in exterior walls or vaulted ceilings along rooflines (required tiers II & III)	2	2 ✓	
14	rigid supply trunk	3	3 ✓	
15	airflow for each duct run measured and balanced to within 15 cfm of design value (balancing dampers required) (required tier III)	5		test results
16	multiple return ducts (min 1 in each bedroom) or transfer grills (required tiers II & III)	3		
17	interior doors with 1 inch clearance to finish floor	1	1 ✓	
<b>DUCTWORK / AIR HANDLER SUBTOTAL</b>			12	
<b>2J - DUCT BLASTER TEST</b>				
1	REQUIRED: Duct blaster test result <6% of floor area served leakage to outside	-		test results
2	REQUIRED: If infiltration is <0.25cfm50/sfba and the air handler and ductwork are in conditioned space then total leakage must be <15% of floor area served.	-		test results
3	Duct blaster test result <5% of floor area served leakage to outside (required tier II)	20	20	test results
4 ★	Duct blaster result <4% of floor area served leakage to outside (required tier III)	25		test results
<b>DUCT BLASTER TEST SUBTOTAL</b>			20	

		Points	SCORE	DOCUMENTATION
<b>2K - WATER HEATER</b>				
1	REQUIRED: heat trap on all water heaters	-		
2	shower drain heat recovery device	2		
3	high efficiency water heater (min Energy Factor: gas 0.59 electric 0.92) <i>(required tier III)</i>	1		energy guide label
4 ★	high efficiency water heater (min Energy Factor: gas 0.61 electric 0.93)	2	2 ✓	energy guide label
5	tankless gas water heater	3	3 ✓	
6	water heater tank insulation	1		
7	pipe insulation on first two feet of pipe <i>(required tiers II &amp; III)</i>	1		
8	insulate 100% of hot water pipe to R4	1		
9	heat recovery water heating	1		
10	solar domestic water heating (min 40% of annual load)	10		
11	heat pump water heater	4		
12	all hot water fixtures have less than 20 ft of pipe connecting them to water heater	2		
<b>WATER HEATER SUBTOTAL</b>			<b>5</b>	
<b>2L - ENERGY EFFICIENT LIGHTING / APPLIANCES</b>				
1	light tubes, cupola, or clerestory for daylighting	2		
2	ENERGY STAR Advanced Lighting Package <i>(required tier III)</i>	2		
3	preset lighting control system (minimum 5 scenes and whole house off feature)	2		
4	automatic indoor lighting controls (min kitchen(s), bath, hall, closets, and utility room(s) have manual-on occupancy sensors or timers)	3		
5	indoor fluorescent fixtures with integrated ballast (min 10 watts / 100 s.f. of conditioned floor area) <i>(required tier III)</i>	2		
6	100% fluorescent fixtures in garage	1		
7	all recessed light fixtures are ballasted compact fluorescents or LED	2		
8	screw-in compact fluorescent bulbs (min 90% of bulbs) or screw-in LED bulbs (min 50% of bulbs) (bulbs in appliances excluded)	2		
9 ★	5 or more ENERGY STAR bath fans, light fixtures, ceiling fans with light fixtures, appliances (excluding dishwasher and refrigerator) <i>(required tiers II &amp; III)</i>	3	3 ✓	product literature
10	automatic outdoor lighting controls (e.g. motion sensor) with integral photocell to prevent daytime use	2		
11	high efficiency exterior lighting	2		product literature
12	ENERGY STAR dishwasher <i>(required tiers II &amp; III)</i>	1	1 ✓	product label
13	ENERGY STAR refrigerator	2		product label
14	no garbage disposal	1	1 ✓	
15	ENERGY STAR clothes washer	1		product label
16	ENERGY STAR clothes washer with a water factor ≤6.0 gals per cubic foot of capacity	2		product label
<b>ENERGY EFFICIENT LIGHTING / APPLIANCES TOTAL</b>			<b>5</b>	
<b>ENERGY EFFICIENT BUILDING TOTAL</b>			<b>5</b>	
<b>Builder must earn for: tier 1 min 80 pts., max 90 pts., tier 2 min 90 pts., max 100 pts., tier 3 min 100 pts., max 110 pts.</b>				
<b>3 - RESOURCE EFFICIENT DESIGN</b>				
1	total floor area of house <1800 square feet	6		
2	total floor area of house 1800-2100 square feet	4	4 ✓	
3	total floor area of house 2100-2500 square feet	2		
4	outside dimensions of floor plan adheres to 2-ft dimensions	2		
5	floor joists @ 24-in. centers (all floors)	5		
6	floor joists @ 19.2-in. centers (all floors)	3		
7	non-load bearing wall studs @ 24-in. centers	2	2 ✓	
8	all wall studs @ 24-in. centers	3		
9	window rough openings eliminate jack stud	2		
10	non-structural headers in non-load bearing walls	2	2 ✓	
11	single top plate with stacked framing	3		
12	2-stud corners with drywall clips or alternative framing	2	2 ✓	
13	T-walls with drywall clips or alternative framing	2	2 ✓	
14	job site framing plan with cut list <i>(required tier III)</i>	1		frame plan + cut list
15	job site framing plan with locations of studs, joists, and roof structure with cut list	10		frame plan + cut list
<b>RESOURCE EFFICIENT DESIGN TOTAL</b>			<b>12</b>	
<b>Builder must earn a minimum for: tier 1 - 2 pts., tier 2 - 3 pts., tier 3 - 4 pts.</b>				

Points SCORE DOCUMENTATION

4 - RESOURCE EFFICIENT BUILDING MATERIALS		
<b>4A - RECYCLED AND NATURAL CONTENT MATERIALS</b>		
1	sustainably harvested lumber (50%)	3 product literature
2	25% of cement in concrete replaced with fly ash or slag	3 content print-out
3	recycled concrete used as aggregate	1 letter
4	insulation (min 25% recycled content)	1 1 / product literature
5	reclaimed wood flooring	2 letter
6	recycled content tiles (min 30% recycled)	2 product literature
7	cork or bamboo flooring (min 10% of total floor area)	2
8	carpet (min 50% recycled)	2 product literature
9	biodegradable carpet and backing (wool, hemp, etc.)	2
10	outdoor decking and porches (min 40% recycled content)	3 product literature
11	air conditioner condensing unit pad (min 50% recycled content)	2 1 product literature
12	composite roofing shingle with recycled content (min 25% recycled)	2 product literature
13	cabinet faces are reused, MDF, local species, or FSC certified wood	2 product literature
<b>RECYCLED AND NATURAL CONTENT MATERIALS SUBTOTAL</b>		1
<b>4B - ADVANCED PRODUCTS</b>		
1	engineered floor framing (80%)	2 2 ✓
2	use of open web trusses to run ductwork	2
3	engineered roof framing	3 3 ✓
4	all beams are steel, engineered wood, or trusses	1 1 ✓
5	all structural headers are steel or engineered wood	1
6	engineered wall framing (25% of studs)	1
7	engineered wall framing (80% of studs)	2
8	interior trim finger jointed, MDF, or HDF	1 = product literature
9	engineered exterior trim including soffit, fascia, and trim	1
10	steel interior wall framing	1
11	panelized wall construction delivered to the job site pre-framed	2
12	modular construction for the entire house	2
13	Precast Autoclaved Aerated Concrete	5
14	Structural Insulated Panels for exterior walls	2
15	Structural Insulated Panels for roof	2
16	Insulated Concrete Forms for foundation walls	2
17	Insulated Concrete Forms for exterior walls	2
<b>ADVANCED PRODUCTS SUBTOTAL</b>		6

		Points	SCORE	DOCUMENTATION
<b>4C - DURABILITY</b>				
1	REQUIRED: flashing at wall/roof intersection integrated with wall and roof drainage planes	-		
2	REQUIRED: flashing at deck/wall or porch/wall intersection integrated with drainage planes	-		
3	REQUIRED: maintain 2" clearance between wall siding and roof surface (or per product manufacturer installation specification)	-		
4	REQUIRED: for roofs that slope along an adjoining wall surface, kick-out flashing is installed	-		
5	REQUIRED: all roof valleys direct water away from walls, dormers, chimneys, etc.	-		
6	REQUIRED: double layer of builder paper or housewrap behind cementitious stucco or stone veneer or synthetic stone veneer (no drainage cavity necessary) on framed walls	-		
7	REQUIRED: framed walls covered with drainage plane (drainage membrane, builder paper, housewrap or XPS foam)	-		
8	sealed crawlspace (unless house is in 100-year flood plain) <i>(required tiers II &amp; III)</i>	4	4	
9	roofing (min 30-year warranty)	1	1	warranty
10	roofing (min 40-year warranty)	2		warranty
11	roofing (min 50-year warranty)	3		warranty
12	roof drip edge	1	1	✓
13	exterior cladding (min 3 sides) with 40-year warranty or durable natural material	1		
14	drainage plane installed with all seams and edges sealed per manufacturer's recommendation	1		
15	back-primed siding and trim (or vented rain screen behind siding) <i>(required tiers II &amp; III)</i>	1		
16	windows with minimum 25-year warranty	1	1	
17	10 year warranty on all insulated glazing	1	1	warranty
18	window and door pan & sill flashing integrated with drainage plane <i>(required tiers II &amp; III)</i>	2		
19	window and door head flashing integrated with drainage plane <i>(required tiers II &amp; III)</i>	3		
20	continuous foundation termite flashing	1		✓
21	roof gutters that discharge water 5 feet away from foundation or other drainage system meeting same intent <i>(required tier III)</i>	1	1	✓
22	covered entryways (all doors)	2	2	✓
23	insulate cold water pipes inside conditioned space and in inaccessible interstitial locations for condensation prevention	1		
24	paperless drywall in kitchens, baths and foundation walls <i>(required tier III)</i>	2		✓
25	non-toxic pest treatment of all lumber in contact with foundation	?	1	product literature
26	non-toxic pest treatment applied to all lumber	?	1	product literature
27	non-toxic mold inhibitor with warranty applied to lumber	1		warranty
28	plants installed to maintain minimum 2 foot distance from home to maturity	2		
29	outdoor deck material (min 25-year warranty)	1		warranty
<b>DURABILITY SUBTOTAL</b>			13	
<b>RESOURCE EFFICIENT BUILDING MATERIALS TOTAL</b>			20	
<b>Builder must earn a minimum for: tier 1 - 6 pts., tier 2 - 12 pts., tier 3 - 16 pts.</b>				
<b>5 - WASTE MANAGEMENT</b>				
1	REQUIRED: No construction materials shall be burned or buried on job site or anywhere but in a state-approved landfill	-		
2	central cut area <i>(required tiers II &amp; III)</i>	3	3	✓
3	donation of excess materials or re-use (min \$500/job)	1	1	letter
4	in-fill building deconstruction with minimum 25% material re-use	2		
5	posted and enforced job site waste management plan - recycle 75% of 3 materials	5		management plan
6	divert 75% of wood	3		
7	divert 75% of cardboard	1		
8	divert 75% of metal	1		
9	divert 75% of drywall (recycle or grind and spread on site)	3		
10	divert 75% of plastics	1		
11	divert 75% of shingles	1		
<b>WASTE MANAGEMENT TOTAL</b>			3	
<b>Builder must earn a minimum for: tier 1 - 3 pts., tier 2 - 4 pts., tier 3 - 6 pts.</b>				

6 - INDOOR AIR QUALITY		Points	SCORE	DOCUMENTATION
1	ENERGY STAR Indoor Air Package	4		
<b>6A - COMBUSTION SAFETY</b>				
1	REQUIRED: No unvented combustion fireplaces or space heaters	-		
2	REQUIRED: No duct runs from house system serving garage	-		
3	REQUIRED: Attached garage - seal bottom plate, penetrations, and band area	-		
4	REQUIRED: No air handler equipment in garage or conditioned air supplied to garage	-		
5	REQUIRED: Sealed combustion furnace or furnace isolated from conditioned space (all units)	-		
6	REQUIRED: water heater in conditioned space is sealed combustion, power vent, direct vent or electric (no atmospherically vented water heaters in conditioned space)	-		
7	detached garage or no garage	5		
8	attached garage - exhaust fan controlled by motion sensor or timer	2		
9	all fireplaces have outside combustion air supplied to them	(required tiers II & III) 3	3 ✓	
10	carbon monoxide detector (one per floor required)	4	4 ✓	
11	backdraft depressurization test	4		test results
<b>COMBUSTION SAFETY SUBTOTAL</b>			7	
<b>6B - MOISTURE CONTROL</b>				
1	REQUIRED: gravel bed beneath subgrade, on-grade, or raised slab	-		
2	variable speed blower	2	2 ✓	
3	humidistat or thermostad used with variable speed cooling system	2		
4	wholehouse, basement or sealed crawlspace dehumidification system	3		
5	plastic as footing wrap or capillary break between footing and foundation	2		
6	foundation drain on top of footing	1	1 ✓	
7	foundation drain at outside perimeter edge of footing	2		
8	drainage board for below grade walls	4		
9	vapor barrier beneath slab (above gravel) or in crawlspace	(required tiers II & III) 1	1 ✓	
10	vapor barrier is 10 mil or thicker or reinforced	1		
11	100% coverage of vapor barrier in crawlspace all seams sealed to piers, walls	(required tier III) 1	1 ✓	
12	capillary break between foundation and framing for all walls	(required tiers II & III) 1	1 ✓	
<b>MOISTURE CONTROL SUBTOTAL</b>			6	
<b>6C - VENTILATION</b>				
1	REQUIRED: bathroom exhaust fans & clothes dryers must be ducted to outside	-		
2	REQUIRED: locate all air intakes >10' away from exhaust outlets and vehicle idling zones	-		
3	REQUIRED: outside air intake with mechanical damper controlled by ventilation timer if blower door test result <math>\leq 0.25 \text{ cfm50/SFBE}</math>	-		
4	passive, labeled radon/soil gas vent system	(required tier III, EPA zones 1 & 2) 4	4 ✓	
5	radon test of home prior to occupancy	2		
6	bath fans ducted with rigid duct (all units)	1	1 ✓	
7	automatic tub/shower room fan controls (e.g. timer or humidistat)	1		
8	kitchen range hood or downdraft vented to exterior	(required tiers II & III) 3	3 ✓	
9	whole house fan	2		
10	third-party testing of each exhaust air flow rate	1		test results
11	outside air intake without damper (10 cfm/bedroom or ASHRAE 62.2)	(required tiers II & III) 3		
12	damper on outside air intake	1	1 ✓	
13	outside air intake with mechanical damper controlled with ventilation timer	(required tier III) 4		
14	ventilation timer on outside air intakes	(required tiers II & III) 3		
15	third-party testing of the outdoor air flow rate	1		test results
16	energy recovery ventilator	7	7 ✓	
17	ceiling fans (minimum of 3 fans)	1		
18	effective cross ventilation with insect screens	3	3 ✓	design on plans
19	effective stack ventilation (e.g. cupola or clerestory with operable windows and insect screens)	3		design on plans
20	if there is a garage storage room or cabinet, that space is vented to outside	(required for tier III) 1		
21	no power roof vents	(required tiers II & III) 1	1 ✓	
<b>VENTILATION SUBTOTAL</b>			20	

		Points	SCORE	DOCUMENTATION
<b>6D - INDOOR POLLUTANT CONTROL</b>				
1	REQUIRED: Ducts in floor protected until floor finishing	-		
2	all insulation urea-formaldehyde free	1	1	
3	subfloor urea-formaldehyde free	1	1	product literature
4	all cabinets, shelves, and countertops urea-formaldehyde free	3		product literature
5	all surfaces of particle board in house sealed with water-based sealant	1		product literature
6	reduced VOC paints (less than 250 g/L)	1		product literature <i>(required tiers II &amp; III)</i>
7	low VOC paints (less than 150 g/L)	3		product literature
8	reduced VOC stains and finishes on wood floors	1		product literature
9	low VOC sealants and adhesives (less than 250 g/L)	1		product literature
10	no carpet in below grade rooms	1		
11	low VOC carpet certified by the Carpet & Rug Institute Green Label or no carpet in home	1		product literature <i>(required tier III)</i>
12	low VOC carpet certified by the Carpet & Rug Institute Green Label Plus	2		product literature
13	low VOC carpet pad certified by the Carpet & Rug Institute Green Label or no carpet in home	1		<i>(required tier III)</i>
14	low VOC carpet pad adhesive certified by the Carpet & Rug Institute Green Label Plus or no carpet in home	1		product literature <i>(required tier III)</i>
15	use of 10 GreenGuard certified materials or equivalent inside the home	3		product literature
16	flush home with fresh air continuously for one week prior to occupancy	1		
17	alternative termite treatment with no soil pretreatment unless required by code	2		<i>(required tiers II &amp; III)</i>
18	alternative pest control	2		
19	provide rodent and corrosion proof screens for all openings not fully sealed or caulked	1		<i>(required tiers II &amp; III)</i>
20	central vacuum system with outside collection receptacle	1		
21	permanent walk-off mats installed at each entry	1		
22	filter / air cleaner MERV 8 or better (e.g. pleated filter)	1		
23	2" pleated filter or thicker	2		
24	ducts protected until construction is completed	2	2	<i>(required tier III)</i>
<b>INDOOR POLLUTANT CONTROL SUBTOTAL</b>			14	
<b>INDOOR AIR QUALITY TOTAL</b>			37	
<b>Builder must earn a minimum for: tier 1 - 15 pts., tier 2 - 25 pts., tier 3 - 35 pts.</b>				
<b>7 - WATER CONSERVATION</b>				
1	EPA WaterSense Home certification	4		EPA Certification
<b>7A - INDOOR USE</b>				
1	REQUIRED: All fixtures must meet National Energy Policy Act low flow standards.	-		
2	house water pressure 60 psi maximum	3		
3	water filter (NSF certified, minimum 85% efficient)	1		product literature
4	ENERGY STAR clothes washer (or equivalent) or front-loading clothes washer	3		product label
5	low-flow lavatory faucets (max 2.0 gal/min)	1		product literature
6	WaterSense labeled lavatory faucets (1.5 gal/min)	3		product literature
7	low-flow showerheads (max 2.25 gal/min)	1	1	product literature
8	high efficiency showerheads (max 1.75 gal/min)	3	3	product literature
9	low-flush (max 1.45 gal/flush) or dual-flush toilets	2		product literature
10	WaterSense labeled toilets (1.28 gal/flush)	3		product literature
11	composting toilet	5		
12	hot water demand re-circulation (not continuous circulation)	2		
13	manifold distribution system (longest branch max 10 feet for 1-story and max 15 feet for 2-story)	4		
<b>INDOOR USE SUBTOTAL</b>			35	

		Points	SCORE	DOCUMENTATION
<b>7B - OUTDOOR USE</b>				
1	REQUIRED: if installed, irrigation system must have rain sensor shutoff switch	-		
2	xeriscape™ landscape with maintenance plan provided to homeowner	4		xeriscape plan
3	soil tested and amended	4		test results
4	turf does not exceed the lesser of 40% of landscaped area or 1000 square feet. Turf is not installed in strips less than 8 feet wide or on slopes greater than 4:1.	4		
5	non-turf, non-hardscapes covered with at least 2 inch layer of mulch or gravel	1		
6	installed landscape has a water budget with <60% evapotranspiration rate	1		calculations
7	drought-tolerant / native landscaping plant (minimum 85% of plantings)	3		(required tier III)
8	use no invasive plant species, as identified by local Agricultural Cooperative Extension Service	1	1	(required tier III) ✓
9	shade at least 50% of hardscape within 50 feet of home	1		
10	irrigation system designed and installed by WaterSense certified irrigation professional	1		
11	weather station or soil moisture sensor on irrigation system	2		
12	irrigation system zoned for specific water needs in each planting area	1		
13	check valves in heads	1		
14	no irrigation system and xeriscape™ guidebook given to homeowner	3	2	resource
15	drip irrigation system	3		
16	greywater irrigation	5		
17	rainwater harvest system	4		
18	at least one rain barrel with hose bib (minimum 1 downspout connection)	1		
19	permeable pavement driveway / parking area	2		
20	timer on exterior water spigots	1		
<b>OUTDOOR USE SUBTOTAL</b>			4	
<b>WATER CONSERVATION TOTAL</b>			17	
<b>Builder must earn a minimum for: tier 1 - 3 pts., tier 2 - 5 pts., tier 3 - 10 pts.</b>				
<b>8 - HOMEBUYER EDUCATION</b>				
1	guaranteed energy bills	10		energy bill guarantee
2	review energy operations with homeowner	1	1	(required tiers II & III) ✓
3	review irrigation system operations and xeriscape™ guidebook given to homeowner	1		(required tiers II & III) resource
4	environmental features checklist for walk through	4	4	✓
5	built-in recycling center	2		
6	local recycling contact	1		
7	household hazardous waste resources	1		
8	backyard composting bin with instructions for use	1		
9	backyard composting bin with instructions for use and no garbage disposal	2		
<b>HOMEBUYER EDUCATION TOTAL</b>			5	
<b>Builder must earn a minimum for: tier 1 - 1 pts., tier 2 - 2 pts., tier 3 - 4 pts.</b>				
<b>9 - BUILDER OPERATIONS</b>				
1	REQUIRED: Must build at least 1 EarthCraft House every year (if building >50 homes a year, must build at least 5 EarthCraft Houses every year)	-		
2	builder commits 80% of total homes to EarthCraft House standards	3		
3	builder commits 100% of total homes to EarthCraft House standards	5		
4	markets EarthCraft House program	2	2	✓
5	environmental checklist provided to all subcontractors	2	2	(required tier III)
6	uses HBA Homeowner Handbook for warranty standards (or approved equiv.)	2	2	
7	Certified Professional Home Builder (or approved equiv.)	2		certificate
<b>BUILDER OPERATIONS TOTAL</b>			2	
<b>Builder must earn a minimum for: tier 1 - 2 pts., tier 2 - 4 pts., tier 3 - 6 pts.</b>				

		Points	SCORE	DOCUMENTATION
<b>10 - BONUS POINTS</b>				
1	house located within 1/2 mile of park available for homeowner use	1	1 ✓	
2	site located within 1/4 mile of mass transit	5	5 ✓	
3	sidewalk connects house to business district (max 2 miles)	5		
4	lot designed for clearly defined pedestrian access to community paths	1	1 ✓	
5	covered and usable front porch	1	1 ✓	
6	brownfield site	5		
7	green roof system installed minimum 30% of total roof area on lot	4		
8	solar, micro-hydro or wind electric system (minimum 0.5 kW production)	25		system specs
9	on-site fuel cell or co-generation system	3		
10	solar-ready home	5		
11	use building materials extracted, processed and manufactured within 500 miles of site (0.5 pts each, max 5 pts)	0.5 per item		list of products and manufacturer
12	Easy Living accessibility / visitability certification	2		certificate
13	USGBC LEED for Homes certification	2		
14	American Lung Association Health House	4		certificate
15	exceeds ENERGY STAR (1 point for each 3%) max 5 points			HERS rating index
16	Innovation points - Builder submits specifications for innovative products or design features to qualify for additional points			
<b>BONUS POINTS TOTAL</b>			<b>8</b>	

<b>EARTHCRAFT HOUSE TOTALS</b>		Earned	Min/Max
<b>SITE PLANNING</b>		5	(Min 4, 6, 8)
<b>ENERGY EFFICIENT BUILDING ENVELOPE AND SYSTEMS</b>		90	(Min 80, 90, 100) (Max 90, 100, 110)
<b>RESOURCE EFFICIENT DESIGN</b>		15	(Min 2, 3, 4)
<b>RESOURCE EFFICIENT BUILDING MATERIALS</b>		20	(Min 6, 12, 16)
<b>WASTE MANAGEMENT</b>		3	(Min 3, 4, 6)
<b>INDOOR AIR QUALITY</b>		37	(Min 15, 25, 35)
<b>WATER CONSERVATION</b>		7	(Min 3, 5, 10)
<b>HOME BUYER EDUCATION</b>		5	(Min 1, 2, 4)
<b>BUILDER OPERATIONS</b>		2	(Min 2, 4, 6)
<b>BONUS POINTS</b>		2	
<b>GRAND TOTAL</b>		183	(Min 150, 200, 230)

HERS 7

# Certificate of ARI-Certified Performance

The following

Split System: Heat Pump with Remote Outdoor Unit-Air-Source

Outdoor Unit Model Number: H4H318GKA\*

combined with

Indoor Unit Model Number: FS(M,U)4X18\*\*\*\*

Manufactured by: HEIL

under the Trade/Brand name: QUIETCOMFORT DX 1300 R410A HP

has been rated in accordance with

AHRI Standard 210/240-2006 for UNITARY AIR-CONDITIONING AND AIR-SOURCE HEAT PUMP EQUIPMENT

and is certified by the Air-Conditioning, Heating, and Refrigeration Institute to meet

the following product performance ratings:

Cooling Capacity (Btuh):	17400
EER Rating (Cooling):	10.80
SEER Rating (Cooling):	13.00
Heating Capacity(Btuh) @ 47 F:	18000
Region IV HSPF Rating (Heating):	7.80
Heating Capacity(Btuh) @ 17 F:	10800

A \* following a rating indicates a voluntary rerate of previously published data, unless accompanied with a WAS which indicates an involuntary rerate.



<b>ARI Reference #:</b>	<b>1321824</b>
<b>Today's Date:</b>	<b>5/3/2009</b>
<b>Status:</b>	<b>Discontinued</b>

CERTIFIED RATINGS ARE VALID ONLY FOR THE PARTICULAR COMBINATION OF INDOOR AND OUTDOOR UNITS LISTED IN THE AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE'S DIRECTORY OF CERTIFIED EQUIPMENT. VISIT [WWW.AHRIDIRECTORY.ORG](http://WWW.AHRIDIRECTORY.ORG) TO VERIFY THAT THIS COMBINATION IS AN ACTIVE LISTING AND THE DATA LISTED ON THIS CERTIFICATE IS ACCURATE. SEARCH ON THE ARI REFERENCE # TO QUICKLY LOCATE THIS COMBINATION IN THE DIRECTORY.

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