

TRANSMISSION VERIFICATION REPORT

TIME : 12/16/2005 11:49  
 NAME : CITY OF SACRAMENTO  
 FAX : 9168085543  
 TEL : 9168085556  
 SER.# : BROH4J832840

DATE, TIME	12/16 11:47
FAX NO./NAME	99208409
DURATION	00:01:37
PAGE(S)	03
RESULT	OK
MODE	STANDARD

*Kleen  
Car*

**CITY OF SACRAMENTO  
 CASHIER'S WORKSHEET**

**ISSUED  
 CITY OF SACRAMENTO**

**DEC 16 2005**

**DOWNTOWN PERMIT  
 CENTER**

RECEIPT NUMBER: R0523995  
 TRANSACTION DATE: 12/16/2005  
 TRANSACTION AMOUNT: 190.72  
 NOTATION:

APD #: **0519606**  
 SITE ADDRESS: 6489 GREENHAVEN DR SAC  
 PARCEL: 030-0220-007

TYPE: Bldg Minor Permit  
 SUB-TYPE: RES  
 HOUSING: N  
 STATUS: **ISSUED**

Mixed Income Housing  
 Fee Program  
 ??

TRANSACTION LIST

Type	Method	Description	Pymt Amount
Payment	Credit C	TEETER	190.72

RECEIPT ACCOUNT ITEM LIST

Class #	Description	Item #	Total Fee	Prev Pymt	Current Pymt
200	Permit--Building-Res	1100	175.00	.00	175.00
206	City Business Oper Tax	1730	3.41	.00	3.41
213	General Plan Surcharge	1760	5.31	.00	5.31
259	Bldg-Technology Surcharg	1750	7.00	.00	7.00

*Kleen  
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**CITY OF SACRAMENTO  
CASHIER'S WORKSHEET**

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CITY OF SACRAMENTO  
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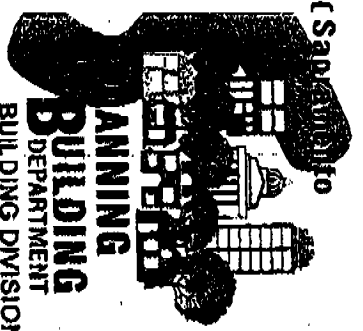
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**PAID  
CITY OF SACRAMENTO  
DEC 15 2005  
NEW CITY HALL**



### FAXBACK PERMIT APPLICATION

(certain restrictions apply)

Faxed request received before 3:00 p.m. will be processed the following work.  
Contractors a current certificate of Worker's Compensation Insurance.  
Work start a Building Permit is issued will be subject to quad fees.

Requiring plan review are not eligible for FAXBACK

In order to process this request, ALL of the following information MUST be provided:

Inspection Request # (916) 264-7622  
Fax # (916) 264-1901  
Hard Info on File? Yes  No

RESIDENTIAL  APARTMENTS (4+ units per building)

COMMERCIAL

Address: 16489 GREENHAVEN DR  
 Infract Price \$ 8517.00  
 CONTACT PHONE: EARL COX  
 Licent # 9774  
 Property Owner: HELEN RAINWATER  
 Contractor: KLEEN AIR  
 Address: 1651 SILICA AVENUE  
 City/State/Zip: SACRAMENTO, CA 95831  
 City/State/Zip: SACRAMENTO, CA 95831  
 Phone: 916-427-2812  
 Phone: 916-922-3995  
 FAX: 8409

NATURE OF WORK: (Provide detailed descript & indicate type of work in selections below.)

Nature of Work: CHANGE OUT PACKAGE ON ROOF

<input type="checkbox"/> REROOF (excluding tile) <input type="checkbox"/> TEAR-OFF <input type="checkbox"/> RESHEET <input type="checkbox"/> HOUSE # SQUARES 1      2      3+	<input checked="" type="checkbox"/> HVAC INSTALLATI <input type="checkbox"/> NEW DUCT <input type="checkbox"/> Heat <input type="checkbox"/> Par. <input type="checkbox"/> Spl <input checked="" type="checkbox"/> Ro- <input type="checkbox"/> Cur <input type="checkbox"/> He cl. unit to <input type="checkbox"/> gas <input type="checkbox"/> Ws <input type="checkbox"/> Fire <input type="checkbox"/> Other(s)	<input type="checkbox"/> WATER HEATER <input type="checkbox"/> GAS <input type="checkbox"/> ELECTRIC <input type="checkbox"/> Change-out <input type="checkbox"/> Electric to Gas <input type="checkbox"/> Relocate <input type="checkbox"/> New	<input type="checkbox"/> DRY ROT OR TERMITE DAMAGE <input type="checkbox"/> REPAIR <input type="checkbox"/> Flooring/Joists <input type="checkbox"/> Roof Structure <input type="checkbox"/> Exterior <input type="checkbox"/> Mud/sill/Studs	<input type="checkbox"/> PUBLIC UTILITIES SAFETY INSPECTION * (Residential and single apartment units ONLY) <input type="checkbox"/> SMUD <input type="checkbox"/> PG&E	<input type="checkbox"/> MINDR ELECTRIC MINDR <input type="checkbox"/> Electic Change # amps <input type="checkbox"/> Rep <input type="checkbox"/> f <input type="checkbox"/> Rep <input type="checkbox"/> Wire <input type="checkbox"/> f <input type="checkbox"/> f

\*NOTE: Correction Notice Items will require an additional building permit.

Sign Review approval may be required.

ISSUED  
CITY OF SACRAMENTO  
DEC 16 2005  
DOWNTOWN PERMIT  
CENTER

Permit # 0919000  
190-72  
AR 000-2

**CERTIFICATE OF COMPLIANCE: RESIDENTIAL (Page 2 of 4) CF-1R**

Project Title Rainwater Residence Date 12-12-05

**FENESTRATION PRODUCTS - U-FACTOR AND SHGC**

FENESTRATION MAXIMUM ALLOWED AREA WORKSHEET WS-4R --must be included for New Construction, Additions and Alterations.

Skylight	N, S, E, W <sup>1</sup>	(ft <sup>2</sup> )	U-factor <sup>2</sup>	Source <sup>3</sup>	SHGC <sup>4</sup>	Source <sup>5</sup>	REMARKS
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>

- 1) Skylights are now included in West-facing fenestration area if the skylights are tilted to the west or tilted in any direction when the pitch is less than 1:12. See §151(f)3C and in Section 3.2.3 of the Residential Manual
- 2) Enter values in this column are either NFRC Rated value or from Standards default Table 116A.
- 3) Indicate source either from NFRC or Table 116A.
- 4) Enter values in this column from NFRC or from Standards Default Table 116B or adjusted SHGC from WS-3R.
- 5) Indicate source either from NFRC or Table 116B.
- 6) Shading Devices are defined in Table 3-3 in the Residential Manual and see WS-3R to calculate Exterior Shading devices.
- 7) See Section 3.2.4 in the Residential Manual.

**HVAC SYSTEMS**

Heating Equipment Type and Capacity (furnace, heat pump, boiler, etc.)	Minimum Efficiency (AFUE or HSPF)	Distribution Type and Location (ducts, attic, etc.)	Duct or Piping R-Value	Thermostat Type	Configuration (split or package)
package furnace	80	ducts	4.2	prog.	package

Cooling Equipment Type and Capacity	Minimum Efficiency	Duct Location	Duct	Thermostat	Configuration



Contractor Information				City	Zip	Phone	Fax
Contractor Name	KLEEN AIR			SACRAMENTO	95815	916-922-3995	916-920-8409
Address	1657 SILICA AVENUE						
Company Contact	Est Start	Est Complete	Job Number	Permit Number	License #	Company ID #	
EARL COX	12/19/2005	12/21/2005	SEARS-5240814	519606	481974	40005	
Residential Project Information				City	Zip	Phone	Fax/ email
Owner's Name/ Project Title	HELEN RAINWATER			SACRAMENTO	95831	916-427-2812	
Address	6489 GREENHAVEN DRIVE						
Bid Dept - Permit From	Utility	Sample	Plan #	Group #	House #		
CITY OF SACRAMENTO	SMUD	7	40005	520S--	1032		
Building Information							
Multi Family	# of Dwellings	Front Orientation (N,S,E,W)	W	Heat Load	80,702	BTUs	
Single Family	Slab Floor	Number of Stories	1	Cool Load	48,942	BTUs	
Addition-new rm	Raised Floor	Conditioned Floor Area	1800	Duct Location	ATTIC		
Alteration-change	Climate Zone	Maximum Ceiling Height	8	Garage		Duct - R value	R4
Equipment Information							
Package Unit	Gas / Electric	AFUE	80.00	SEER	12	Heat: BTU Input	80,000
Split System	Heat Pump	HSPF		EER		Cooling: BTUs	48,000
Heat System Mfg	CARRIER	Condenser Sys Mfg		CARRIER		Coil System Mfg	CARRIER
Model #	48XP-0480903	Model #		Model #		Serial #	
Serial #	3705551323	Serial #		Serial #			

**Title 24 requirements - contractor and HERS verification check list**

CF6R forms on job site Yes Permit # 519606

Furnace Mfg and model # documented Yes Duct System - New or Exist Exist

Furnace serial # documented Yes CFM Leakage 132 CFM

Coil Mfg and model # documented Yes Leakage pressure 25.0 PA

Coil serial # documented Yes Equipment air flow in CFM 1600 CFM

Condenser Mfg and model # documented Yes System % leakage 8.9%

Condenser serial # documented Yes Test Date Dec 21, 2005

TXV verified on split system Yes ARI #

High EER verified on options Yes Notes:

Air distribution system fully ducted Yes

Existing duct tape has draw bands and mastic Yes

All Supply registers sealed for test Yes

All Return grilles sealed for test Yes

Duct blaster w/ rings installed correctly Yes

Smoke required to pass test NO

All register & grille seals removed NO

Thermostat turned on after test NO

Signature [Signature] Date Dec 21, 2005

**HELEN RAINWATER**

Project Title

**6489 GREENHAVEN DRIVE SACRAMENTO CA 95831**

Project Address

**EARL COX 916-922-3995**

Documentation Author Telephone

**Prescriptive 12**

Compliance Method (Prescriptive) Climate Zone

Date

Building Permit #

Plan Check / Date

Field Check / Date

Enforcement Agency Use Only

Alternative Component Package Method: (check one)      C  X      D      D (Alternative)  
 Package C and Package D choices require HERS rater field verification and/or diagnostic testing (see CF-1R page 3)  
 For Package D Alternative see Appendix B Table 151-C Footnotes 7-14

**GENERAL INFORMATION**

Total Conditioned Floor Area (CFA) **1800** ft2 Average Ceiling Height: **8** ft

Maximum Allowed West Facing Fenestration Products Per Table 151-B or 151-C --- (5% X CFA) **NA** ft2

Maximum Allowed Total Fenestration Products Per Table 151-B or 151-C --- (20% X CFA) **NA** ft2

Building Type: (check one or more)      Single Family      Multifamily      Addition  X Alteration

(If adding fenestration fill out WS-4R, Fenestration Maximum Allowed Area Worksheet and see Section 8.3.2 for Additions and 8.3.3 for Alterations.)

Number of Stories: **1** Number of Dwelling Units: **1**

Floor Construction Type:      slab      Slab/Raised Floor (circle one or both)

Front Orientation: **W** North / South / East / West / All Orientations (input front orientation in degrees from True North and circle one).

**RADIANT BARRIER** (required in climate zones 2, 4, 8-15)

**OPAQUE SURFACES INCLUDING OPAQUE DOORS**

Component Type (Wall, Roof, Floor, Slab Edge, Doors)	Frame Type (Wood or Metal)	Cavity Insulation R-Value	Continuous Insulation R-Value	Assembly Ufactor (for wood, metal frame and mass assemblies) 1	Joint Appendix IV Reference	Roof Radiant Barrier Installed Yes or No	Location/Comments (attic, garage, typical, etc.)

1) See Joint Appendix IV in Section IV.2, IV.3 and IV.4, which is the basis for the U-factor criterion. U-factors can not exceed prescriptive value to show equivalence to R-values.

HELEN RAINWATER

Project Title

Date

**FENESTRATION PRODUCTS – U-FACTOR AND SHGC**

FENESTRATION MAXIMUM ALLOWED AREA WORKSHEET WS-4R –must be included for New Construction, Additions and Alterations.

Fenestration #/Type/Pos. (Front, Left, Rear, Right, Skylight)	Orientation, N, S, E, W <sup>1</sup>	Area (ft <sup>2</sup> )	U-factor <sup>2</sup>	U-factor Source <sup>3</sup>	SHGC <sup>4</sup>	SHGC Source <sup>5</sup>	Exterior Shading/Overhangs <sup>6, 7</sup> Ck box if WS-3R is included
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>

- 1) Skylights are now included in West-facing fenestration area if the skylights are tilted to the west or tilted in any direction when the pitch is less than 1:12. See §151(f)3C and in Section 3.2.3 of the Residential Manual
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- 7) See Section 3.2.4 in the Residential Manual.

**HVAC SYSTEMS**

Heating Equipment Type and Capacity (furnace, heat pump, boiler, etc.)	Minimum Efficiency (AFUE or HSPF)	Distribution Type and Location (ducts, attic, etc.)	Duct or Piping R-Value	Thermostat Type	Configuration (split or package)
G/E	80.00 AFUE	ATTIC	R4	Programable	Package
80000 BTU	0 HSPF				

Cooling Equipment Type and Capacity (A/C, Heat Pump, Evap Cool)	Minimum Efficiency (SEER or EER)	Duct Location (attic, etc.)	Duct R-Value	Thermostat Type	Configuration (split or package)
G/E	12 SEER	ATTIC	R4	Programable	Package
48000 BTU	0 EER				

HELEN RAINWATER

Project Title

Date

**SEALED DUCTS and TXVs (or Alternative Measures)**

A signed CF-4R Form must be provided to the building department for each home for which the following are required.

<input type="checkbox"/>	Sealed Ducts (all climate zones) (Installer testing and certification and HERS rater field verification required.)
<input type="checkbox"/>	TXVs, readily accessible (climate zones 2 and 8-15 only) (Installer testing and certification and HERS Rater field verification required.)
<input type="checkbox"/>	Refrigerant Charge (climate zones 2 and 8-15 only) (Installer testing and certification and HERS Rater field verification required.)
OR	
<input type="checkbox"/>	Alternative to Sealed Ducts and Refrigerant Charge /TXVs (See Package D Alternative Package Features for Project Climate Zone in the RM Appendix B Table 151-C, Footnotes 7-14.
OR	
<input type="checkbox"/>	For additions and alterations, duct systems that are not documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Residential ACM Manual and duct systems with more than 40 linear feet in unconditioned spaces shall meet the requirements of Section 150(m) and duct insulation requirements of Package D.

**WATER HEATING SYSTEMS**

<input type="checkbox"/>	Check box if system meets criteria of a "Standard" system. Standard system is one gas-fired water heater per dwelling unit. If the water heater is a storage type, 50 gallons is the maximum capacity and recirculation system is not allowed.
<input type="checkbox"/>	Check box when using Preapproved Alternative Water Heating table, Table 5-4 in Chapter 5 in the Residential Manual. No water heating calculations are required, and the system complies automatically.
<input type="checkbox"/>	Check box if system does not meet criteria of "Standard" system, and does not comply with the Preapproved Alternative Water Heating table. In this case, the Performance Method must be used and must be included in the submittal.
<input type="checkbox"/>	Check box to verify that a time control is required for a recirculating system pump for a system serving multiple units

**Systems serving single dwelling units**

Water Heater Type/Fuel Type	Distribution Type	Number in System	Rated Input <sup>1</sup> (kW or Btu/hr)	Tank Capacity (gallons)	Energy Factor <sup>1</sup> or Thermal Efficiency	Standby <sup>1</sup> Loss (%)	Tank External Insulation R-Value

**System serving multiple dwelling units**

Water Heater Type/Fuel Type	Distribution Type	Number in System	Rated Input <sup>1</sup> (kW or Btu/hr)	Tank Capacity (gallons)	Energy Factor <sup>1</sup> or Thermal Efficiency	Standby <sup>1</sup> Loss (%)	Tank External Insulation R-Value

<sup>1</sup> For small gas storage water heaters (rated inputs of less than or equal to 75,000 Btu/hr), electric resistance, and heat pump water heaters, list Energy Factor. For large gas storage water heaters (rated input of greater than 75,000 Btu/hr), list Rated Input, Recovery Efficiency, Thermal Efficiency and Standby Loss. For instantaneous gas water heaters, list Rated Input and Thermal Efficiencies.

**Pipe Insulation** (kitchen lines > 3/4 inches) All hot water pipes from the heating source to the kitchen fixtures that are 3/4 inches or greater in diameter shall be thermally insulated as specified by Section 150 (j) 2 A or 150 (j) 2 B.



HELEN RAINWATER

Project Title

Date

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- Refrigerant Charge (climate zones 2 and 8-15 only) (Installer testing and certification and HERS Rater field verification required.)

OR

- Alternative to Sealed Ducts and Refrigerant Charge /TXVs (See Package D Alternative Package Features for Project Climate Zone in the RM Appendix B Table 151-C, Footnotes 7-14.

OR

- For additions and alterations, duct systems that are not documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Residential ACM Manual and duct systems with more than 40 linear feet in unconditioned spaces shall meet the requirements of Section 150(m) and duct insulation requirements of Package D.

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- Check box to verify that a time control is required for a recirculating system pump for a system serving multiple units

**Systems serving single dwelling units**

Water Heater Type/Fuel Type	Distribution Type	Number in System	Rated Input1 (kW or Btu/hr)	Tank Capacity (gallons)	Energy Factor1 or Thermal Efficiency	Standby1 Loss (%)	Tank External Insulation R-Value

**System serving multiple dwelling units**

Water Heater Type/Fuel Type	Distribution Type	Number in System	Rated Input1 (kW or Btu/hr)	Tank Capacity (gallons)	Energy Factor1 or Thermal Efficiency	Standby1 Loss (%)	Tank External Insulation R-Value

1 For small gas storage water heaters (rated inputs of less than or equal to 75,000 Btu/hr), electric resistance, and heat pump water heaters, list Energy Factor. For large gas storage water heaters (rated input of greater than 75,000 Btu/hr), list Rated Input, Recovery Efficiency, Thermal Efficiency and Standby Loss. For instantaneous gas water heaters, list Rated Input and Thermal Efficiencies.

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HELEN RAINWATER

Project Title

Date

**COMPLIANCE STATEMENT**

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business and Professions Code)

Documentation Author

Name:	EARL COX	Name:	EARL COX
Title/Firm	KLEEN AIR	Title/Firm	KLEEN AIR
Address:	1657 SILICA AVENUE SACRAMENTO CA 95815	Address:	1657 SILICA AVENUE SACRAMENTO CA 95815
Telephone:	916-922-3995	Telephone:	916-922-3995
License #:	481974		
(signature) (date)		(signature) (date)	

**Enforcement Agency**

Name:	_____	Comments:	_____
Title	_____		
Agency:	_____		
Telephone:	_____		
(signature / stamp)	(date)		

6489 GREENHAVEN DRIVE

SACRAMENTO CA 95831

519606

Site Address HELEN RAINWATER - Owner

Permit Number

An installation certificate is required to be posted at the building site or made available for all appropriate inspections. (The information provided on this form is required) After completion of final inspection, a copy must be provided to the building department (upon request) and the building owner at occupancy, per Section 10-103(a).

**HVAC SYSTEMS:**

**Heating Equipment**

Equip Typ (pkg. heat pum)	CEC Certified Mfr. Name, Model and Serial Number	# of Identical Systems	Efficiency (AFUE, etc.) <sup>1</sup> >(CF-1R value)	Duct Location (attic, etc.)	Duct or Piping R-value	Heating Load (Btu/hr)	Heating Capacity (Btu/hr)
Package	CARRIER	1	80.00 AFUE	ATTIC	R4	80702	80000
	48XP-0480903		0 HSPF				
G/E	0						

**Cooling Equipment**

Equip Typ (pkg. heat pum)	CEC Certified Mfr. Name, Model and Serial Number	# of Identical Systems	Efficiency (AFUE, etc.) <sup>1</sup> >(CF-1R value)	Duct Location (attic, etc.)	Duct or Piping R-value	Cooling Load (Btu/hr)	Cooling Capacity (Btu/hr)
Package	CARRIER	1	12.00 SEER	ATTIC	R4	48942	48000
	0		0 EER				
G/E	0						
	CARRIER						
Coil	0						
	0						

1. > symbol reads greater than or equal to what is indicated on the CF-1R value.  
Include both SEER and EER if compliance credit for high EER air conditioner is claimed.

I, the undersigned, verify that equipment listed above is: 1) is the actual equipment installed, 2) equivalent to or more efficient than that specified in the certificate of compliance (Form CF-1R) submitted for compliance with the Energy Efficiency Standards for residential buildings, and 3) equipment that meets or exceeds the appropriate requirements for manufactured devices (from the Appliance Efficiency Regulations or Part 6), where applicable.

*[Handwritten Signature]*  
Signature, Date Dec 21, 2005

**KLEEN AIR**  
Installing Subcontractor (Co. Name)  
OR General Contractor (Co. Name) OR Owner

COPY TO: Building Department  
HERS Rater (if applicable)  
Building Owner at Occupancy

6489 GREENHAVEN DRIVE

SACRAMENTO CA 95831

519606

Site Address

HELEN RAINWATER - Owner

Permit Number

# INSTALLER COMPLIANCE STATEMENT FOR DUCT LEAKAGE

Copies to: Builder, HERS Rater, Building Owner at Occupancy and Building Department

## INSTALLER COMPLIANCE STATEMENT

The building was:  Tested at Final  Tested at Rough-in

### INSTALLER VISUAL INSPECTION AT FINAL CONSTRUCTION STAGE:

- Remove at least one supply and one return register, and verify that the spaces between the register boot and the interior finishing wall are properly sealed.
- If the house rough-in duct leakage test was conducted without an air handler installed, inspect the connection points between the air handler and the supply and return plenums to verify that the connection points are properly sealed.
- Inspect all joints to ensure that no cloth backed rubber adhesive duct tape is used

### DUCT LEAKAGE REDUCTION

Procedures for field verification and diagnostic testing of air distribution systems are available in RACM, Appendix RC4.3

NEW CONSTRUCTION:		Measured Values	
Duct Pressurization Test Results (CFM @ 25 Pa)			
1 Enter Tested Leakage Flow in CFM:			
2 Fan Flow: Calculated (Nominal: <input checked="" type="checkbox"/> Cooling <input type="checkbox"/> Heating) or <input type="checkbox"/> Measured If Fan Flow is Calculated as 400 cfm/ton x number of tons or as 21.7 cfm/(kBtu/hr) x Heating Capacity in Thousands of Btu/hr, enter total calculated or measured fan flow in CFM here		1600	
3 Pass if Leakage Percentage < 6% for Final or < 4% at Rough-in: [100 x [ _____ (Line # 1) / _____ (Line # 2)]]			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
ALTERATIONS: Duct System and/or HVAC Equipment Change-Out			
4 Enter Tested Leakage Flow in CFM from Pre-Test of Existing Duct System Prior to Duct System Alteration and/or Equipment Change-Out.			
5 Enter Tested Leakage Flow in CFM from Final Test of New Duct System or Altered Duct System for Duct System Alteration and/or Equipment Change-Out.		142	
6 Enter Reduction in Leakage for Altered Duct System [ _____ (Line # 4) Minus _____ (Line # 5) ] - (Only if Applicable)			
7 Enter Tested Leakage Flow in CFM to Outside (Only if Applicable)			
8 Entire New Duct System - Pass if Leakage Percentage < 6% for Final or < 4% at Rough-in [100 x [ _____ (Line # 5) / _____ Line # 2]]			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
TEST OR VERIFICATION STANDARDS: For Altered Duct System and/or HVAC Equipment Change-Out			
Use one of the following four Test or Verification Standards for compliance:			
9 Pass if Leakage Percentage < 15% [100 x [ 142 (Line # 5) / 1600 (Line # 2)]]		8.9%	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
10 Pass if Leakage to Outside Percentage < 10% [100 x [ _____ (Line # 7) / _____ (Line # 2)]]			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
11 Pass if Leakage Reduction Percentage > 60% [100 x [ _____ (Line # 6) / _____ (Line # 4)]] and Verification by Smoke Test and Visual Inspection			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
12 Pass if Sealing of all Accessible Leaks and Verification by Smoke Test and Visual Inspection			<input type="checkbox"/> Pass <input type="checkbox"/> Fail
Pass if One of Lines # 9 through # 12 pass			<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

I, the undersigned, verify that the above diagnostic test results were performed in conformance with the requirements for compliance credit. I, the undersigned, also certify that the newly installed or retrofit Air-Distribution System Ducts, Plenums and Fans comply with Mandatory requirements specified in Section 150 (m) of the 2005 Building Energy Efficiency Standards.

*Charles C. Hittinger* Rec 21, 2005

Signature

Date

KLEEN AIR

Installing Subcontractor (Co. Name) OR  
General Contractor (Co. Name)

6489 GREENHAVEN DRIVE

SACRAMENTO CA 95831

519606

Site Address

HELEN RAINWATER - Owner

Permit Number

*MSA*

THERMOSTATIC EXPANSION VALVE (TXV)

Procedures for field verification of thermostatic expansion valves are available in RACM, Appendix RI.

<input type="checkbox"/> Yes	<input type="checkbox"/> No	Access is provided for inspection. The procedure shall consist of visual verification that the TXV is installed on the system and installation of the specific equipment shall be verified.			
			Yes is a pass	Pass	Fail

REFRIGERANT CHARGE MEASUREMENT

Verification for Required Refrigerant Charge and Adequate Airflow for Split System Space Cooling Systems without Thermostatic Expansion Valves

Outdoor Unit Serial #	
Location	
Outdoor Unit Make	
Outdoor Unit Model	
Cooling Capacity	Btu/hr
Date of Verification	
Date of Refrigerant Gauge Calibration	(must be checked monthly)
Date of Thermocouple Calibration	(must be checked monthly)

Standard Charge Measurement Procedure (outdoor air dry-bulb 55oF and above):

Procedures for Determining Refrigerant Charge using the Standard Method are available in RACM, Appendix RD2.

Note: The system should be installed and charged in accordance with the manufacturer's specifications before starting this procedure.

Measured Temperatures

Supply (evaporator leaving) air dry-bulb temperature (Tsupply, db)		F
Return (evaporator entering) air dry-bulb temperature (Treturn, db)		F
Return (evaporator entering) air wet-bulb temperature (Treturn, wb)		F
Evaporator saturation temperature (Tevaporator, sat)		F
Suction line temperature (Tsuction, db)		F
Condenser (entering) air dry-bulb temperature (Tcondenser, db)		F

Superheat Charge Method Calculations for Refrigerant Charge

Actual Superheat = Tsuction, db - Tevaporator, sat		F
Target Superheat (from Table RD-2)		F
Actual Superheat - Target Superheat (System passes if between -5 and +5°F)		F

Temperature Split Method Calculations for Adequate Airflow

Split Method Calculation is not necessary if Adequate Airflow credit is taken

Actual Temperature Split = T return, db - Tsupply, db		F
Target Temperature Split (from Table RD3)		F
Actual Temperature Split - Target Temperature Split (System passes if between -3°F and +3°F or, upon remeasurement, if between -3°F and -100°F)		F

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Standard Charge Measurement Summary:

*WIA*

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated.

<input type="checkbox"/>	<input type="checkbox"/>	Yes	<input type="checkbox"/>	<input type="checkbox"/>	No	System Passes
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Alternate Charge Measurement Procedure (outdoor air dry-bulb below 55 oF)

Note: The system should be installed and charged in accordance with the manufacturer's specifications and installer verification shall be documented on CF-6R before starting this procedure. If outdoor air dry-bulb is 55 oF or above, installer shall use the Standard Charge Measure Procedure:

Procedures for Determining Refrigerant Charge using the Alternate Method are available in RACM, Appendix RD3.

Weigh-In Charging Method for Refrigerant Charge

Actual liquid line length:		ft
Manufacturer's Standard liquid line length:		ft
Difference (Actual - Standard):		ft
Manufacturer's correction (ounces per foot) _____ x difference in length = _____ ounces		
(+ = add) (- = remove)		

Measured Airflow Method for Adequate Airflow Verification available in RACM, Appendix RD2.6

Calculated Airflow: Cooling Capacity (Btu/hr)	$\times 0.033$ (cfm/Btu-hr) =	CFM
Measured Airflow is	CFM (Measured airflow must be greater than the calculated airflow).	

Alternate Charge Measurement Summary:

System shall pass both refrigerant charge and adequate airflow calculation criteria from the same measurements. If corrective actions were taken, both criteria must be remeasured and recalculated.

<input type="checkbox"/>	<input type="checkbox"/>	Yes	<input type="checkbox"/>	<input type="checkbox"/>	No	System Passes
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Signature, Date

**KLEEN AIR**

Installing Subcontractor (Co. Name) OR  
General Contractor (Co. Name) OR Owner

COPY TO: Building Department  
HERS Rater (if applicable)  
Building Owner at Occupancy

6489 GREENHAVEN DRIVE

SACRAMENTO CA 95831

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**FAN WATT DRAW**

*N/A*

Procedures for measuring the air handler watt draw are available in RACM, Appendix RE3.2.

Method For Fan Watt Draw Measurement			
<input type="checkbox"/>	<input type="checkbox"/>	RE3.2.1	Portable Watt Meter Measurement
<input type="checkbox"/>	<input type="checkbox"/>	RE3.2.2	Utility Revenue Meter Measurement
Measured Fan watt Draw:		Enter results of Watts/cfm:	
Measured Fan Flow (Enter total cfm from airflow verification)		Enter results of Watts/cfm:	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Calculated fan watt/cfm is equal to or lower than the fan watt/cfm draw documented in CF-1R	
		Yes is a pass	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**ADEQUATE AIRFLOW VERIFICATION**

Procedures for field verification and diagnostic testing of adequate airflow are available in RACM, Appendix RE4.1.

Method For Airflow Measurement			
<input type="checkbox"/>	<input type="checkbox"/>	Yes	No
		Duct design exists on plans	
<input type="checkbox"/>	<input type="checkbox"/>	RE4.1.1	Diagnostic Fan Flow Using Flow Capture Hood
<input type="checkbox"/>	<input type="checkbox"/>	RE4.1.2	Diagnostic Fan Flow Using Plenum Pressure Matching
<input type="checkbox"/>	<input type="checkbox"/>	RE4.1.3	Diagnostic Fan Flow Using Flow Grid Measurement
Measured Airflow:			cfm/ton
<input type="checkbox"/>	<input type="checkbox"/>	Yes	No
		Measured airflow is greater than the criteria in Table RE-2	
		Yes is a pass	<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**MAXIMUM COOLING CAPACITY**

Procedures for determining maximum cooling load capacity are available in RACM, Appendix RF3.

1	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	Adequate airflow verified (see adequate airflow credit)
2	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	Refrigerant charge or TXV
3	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	Duct leakage reduction credit verified
4	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	Cooling capacities of installed systems are $\leq$ to maximum cooling capacity indicated on the Performance's CF-1R and RF-3.
5	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	If the cooling capacities of installed systems are $>$ than maximum cooling capacity in the CF-1R, then the electrical input for the installed systems must be $\leq$ to electrical input in the CF-1R.
					Yes to 1, 2, and 3; and Yes to either 4 or 5 is a pass
					<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**HIGH EER AIR CONDITIONER**

Procedures for verification are available in RACM, Appendix RI.

1	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	EER values of installed systems match the CF-1R
2	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	For split system, indoor coil is matched to outdoor coil
3	<input type="checkbox"/>	<input type="checkbox"/>	Yes	No	Time Delay Relay Verified (If Required)
					Yes to 1 and 2; and 3 (If Required) is a pass
					<input type="checkbox"/> Pass <input type="checkbox"/> Fail

**KLEEN AIR**

Tests

Signature, Date

Installing Subcontractor (Co. Name) OR

Performed

General Contractor (Co. Name)

COPY TO: Building Department, HERS Rater, Building Owner at Occupancy