

TITLE 24 REPORT

Title 24 Report for:

Davis Town Home UNIT 4
233 B Street
Davis, CA

Project Designer:

Maria Ogrydziak, Architect
241 B Street
Davis, CA 95616
(530) 756-2346

Report Prepared By:

Larry Froess
ResCom Energy Engineering
3166 Suisun Bay Road
West Sacramento, CA 95691
(916) 373-1383

Job Number:

Date:

10/14/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential

(Part 1 of 4) **CF-1R**

Davis Town Home UNIT 4
 Project Title
 233 B Street Davis
 Project Address
 ResCom Energy Engineering
 Documentation Author
 EnergyPro
 Compliance Method

10/14/2008
 Date
 Building Permit #
 Plan Check/Date
 Field Check/Date

(916) 373-1383
 Telephone
 12
 Climate Zone

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	20.66	3.70	16.97
Space Cooling	18.44	6.96	11.48
Fans	3.78	1.04	2.74
Domestic Hot Water	14.98	8.94	6.04
Pumps	0.00	0.00	0.00
Totals	57.87	20.64	37.23

Percent better than Standard: 64.3%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: Single Family Addition Multi Family Existing + Add/Alt
Building Front Orientation: (E) 90 deg
Fuel Type: Natural Gas
Fenestration:
 Area: 378 ft² Avg. U: 0.39
 Ratio: 29.8% Avg. SHGC: 0.37

Total Conditioned Floor Area: 1,270 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 575 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
HVAC	1,270	10,160	1.00	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Cont.	Act. Azm.	Tilt	Gains Y/N	Condition Status	JA IV Reference	Location / Comments
Roof	None	705	0.048	6 in.	R-18.0	90	0	X	New	06-A8	HOUSE
Wall	None	194	0.051	R-18.6	R-0.0	90	90	X	New	14-D1	HOUSE
Door	None	20	0.500	None	R-0.0	90	90	X	New	28-A4	HOUSE
Wall	None	626	0.051	R-18.6	R-0.0	180	90	X	New	14-D1	HOUSE
Wall	None	390	0.051	R-18.6	R-0.0	270	90	X	New	14-D1	HOUSE
Door	None	18	0.500	None	R-0.0	270	90	X	New	28-A4	HOUSE
Wall	None	690	0.051	R-18.6	R-0.0	0	90	X	New	14-D1	HOUSE

Certificate Of Compliance : Residential

(Part 3 of 4) **CF-1R**

Davis Town Home UNIT 4

10/14/2008

Project Title

Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
HVAC	Combined Hydronic	see below	Split Air Conditioner	14.0 SEER	New	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
HVAC	Radiant Floor	Ducted	Attic	4.2	New	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Takagi T-K1S	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Takagi T-K1S	Large Gas	No Pipe Insulation	1	190,000	0	New	0.84	0.00%	0.0

Multi-Family Central Water Heating Details

Hot Water Pump

Control	#	HP	Type	Hot Water Piping Length (ft)			Add 1/2" Insulation
				In Plenum	Outside	Buried	

REMARKS

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 & Professions Code)

Name: _____
 Title/Firm: Maria Ogrydziak, Architect
 Address: 241 B Street
Davis, CA 95616
 Telephone: (530) 756-2346 Lic. #: _____

(signature) _____ (date) _____

Documentation Author

Name: Larry Froess
 Title/Firm: ResCom Energy Engineering
 Address: 3166 Suisun Bay Road
West Sacramento, CA 95691
 Telephone: (916) 373-1383

(signature) _____ (date) _____

Enforcement Agency

Name: _____
 Title/Firm: _____
 Address: _____
 Telephone: _____

(signature) _____ (date) _____

STAMP

Mandatory Measures Summary: Residential (Page 1 of 2) MF-1R

NOTE: Lowrise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. More stringent compliance requirements from the Certificate of Compliance supercede the items marked with an asterisk (*) below. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

DESCRIPTION	Check or initial applicable boxes or check NA if not applicable and included with the permit application documentation.	N/A	DESIGNER	ENFORCE- MENT
Building Envelope Measures				
* § 150(a):	Minimum R-19 in wood ceiling insulation or equivalent U-factor in metal frame ceiling.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(b):	Loose fill insulation manufacturer's labeled R-Value: _____.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
* § 150(c):	Minimum R-13 wall insulation in wood framed walls or equivalent U-factor in metal frame walls (does not apply to exterior mass walls).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
* § 150(d):	Minimum R-13 raised floor insulation in framed floors or equivalent U-factor.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(e):	Installation of Fireplaces, Decorative Gas Appliances and Gas Logs.			
	1. Masonry and factory-built fireplaces have:			
	a. closable metal or glass door covering the entire opening of the firebox	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	b. outside air intake with damper and control, flue damper and control	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	2. No continuous burning gas pilot lights allowed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(f):	Air retarding wrap installed to comply with §151 meets requirements specified in the ACM Residential Manual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§ 150(g):	Vapor barriers mandatory in Climate Zones 14 and 16 only.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§ 150(l):	Slab edge insulation - water absorption rate for the insulation alone without facings no greater than 0.3%, water vapor permeance rate no greater than 2.0 perm/inch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§ 118:	Insulation specified or installed meets insulation installation quality standards. Indicate type and include CF-6R Form: _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 116-17:	Fenestration Products, Exterior Doors, and Infiltration/Exfiltration Controls.			
	1. Doors and windows between conditioned and unconditioned spaces designed to limit air leakage.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	2. Fenestration products (except field fabricated) have label with certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration certification.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	3. Exterior doors and windows weatherstripped; all joints and penetrations caulked and sealed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Space Conditioning, Water Heating and Plumbing System Measures				
§ 110-13:	HVAC equipment, water heaters, showerheads and faucets certified by the Energy Commission.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(h):	Heating and/or cooling loads calculated in accordance with ASHRAE, SMACNA or ACCA.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(i):	Setback thermostat on all applicable heating and/or cooling systems.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
§ 150(j):	Water system pipe and tank insulation and cooling systems line insulation.			
	1. Storage gas water heaters rated with an Energy Factor less than 0.58 must be externally wrapped with insulation having an installed thermal resistance of R-12 or greater.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	2. Back-up tanks for solar systems, unfired storage tanks, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation and indicated on the exterior of the tank showing the R-value.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. The following piping is insulated according to Table 150-A/B or Equation 150-A Insulation Thickness:			
	1. First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes shall be insulated to Table 150B.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	2. Cooling system piping (suction, chilled water, or brine lines), piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4. Steam hydronic heating systems or hot water systems > 15 psi, meet requirements of Table 123-A.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Insulation must be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Insulation for chilled water piping and refrigerant suction piping includes a vapor retardant or is enclosed entirely in conditioned space.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	7. Solar water-heating systems/collectors are certified by the Solar Rating and Certification Corporation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: Lowrise residential buildings subject to the Standards must contain these measures regardless of the compliance approach used. More stringent compliance requirements from the Certificate of Compliance supercede the items marked with an asterisk (*) below. When this checklist is incorporated into the permit documents, the features noted shall be considered by all parties as minimum component performance specifications for the mandatory measures whether they are shown elsewhere in the documents or on this checklist only.

DESCRIPTION	Instructions: Check or initial applicable boxes when completed or check N/A if not applicable.			ENFORCE- MENT
	N/A	DESIGNER		
Space Conditioning, Water Heating and Plumbing System Measures: (continued)				
§ 150(m): Ducts and Fans				
1. All ducts and plenums installed, sealed and insulated to meet the requirements of the CMC Sections 601, 602, 603, 604, 605, and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4. Exhaust fan systems have back draft or automatic dampers.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operating dampers.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Protection of Insulation. Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7. Flexible ducts cannot have porous inner cores.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 114: Pool and Spa Heating Systems and Equipment				
1. A thermal efficiency that complies with the Appliance Efficiency Regulations, on-off switch mounted outside of the heater, weatherproof operating instructions, no electric resistance heating and no pilot light.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. System is installed with:				
a. At least 36" of pipe between filter and heater for future solar heating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b. Cover for outdoor pools or outdoor spas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Pool system has directional inlets and a circulation pump time switch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
§ 115: Gas fired fan-type central furnaces, pool heaters, spa heaters or household cooking appliances have no continuously burning pilot light. (Exception: Non-electrical cooking appliances with pilot < 150 Btu/hr)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 118 (i): Cool Roof material meets specified criteria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lighting Measures				
§ 150(k)1: HIGH EFFICACY LUMINAIRES OTHER THAN OUTDOOR HID: contain only high efficacy lamps as outlined in Table 150-C, and do not contain a medium screw base socket (E24/E26). Ballasts for lamps 13 Watts or greater are electric and have an output frequency no less than 20 kHz.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)1: HIGH EFFICACY LUMINAIRES - OUTDOOR HID: contain only high efficacy lamps as outlined in Table 150-C, luminaire has factory installed HID ballast.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)2: Permanently installed luminaires in kitchens shall be high efficacy luminaires. Up to 50% of the Wattage, as determined in Section 130(c), of permanently installed luminaires in kitchens may be in luminaires that are not high efficacy luminaires, provided that these luminaires are controlled by switches separate from those controlling the high efficacy luminaires.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)3: Permanently installed luminaires in bathrooms, garages, laundry rooms, utility rooms shall be high efficacy luminaires. OR are controlled by an occupant sensor(s) certified to comply with Section 119(d).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)4: Permanently installed luminaires located other than in kitchens, bathrooms, garages, laundry rooms, and utility rooms shall be high efficacy luminaires (except closets less than 70 ft) OR are controlled by a dimmer switch OR are controlled by an occupant sensor that complies with Section 119(d) that does not turn on automatically or have an always on option.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)5: Luminaires that are recessed into insulated ceilings are approved for zero clearance insulation cover (IC) and are certified to ASTM E283 and labeled as air tight (AT) to less than 2.0 CFM at 75 Pascals.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)6: Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires (not including lighting around swimming pools/water features or other Article 680 locations) OR are controlled by occupant sensors with integral photo control certified to comply with Section 119(d).	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)7: Lighting for parking lots for 8 or more vehicles shall have lighting that complies with Sections 130, 132, and 147. Lighting for parking garages for 8 or more vehicles shall have lighting that complies with Section 130, 131, and 146.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
§ 150(k)8: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires OR are controlled by occupant sensor(s) certified to comply with Section 119(d).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

ENERGY USE AND COST SUMMARY

ECON-1

PROJECT NAME

Davis Town Home UNIT 4

DATE

10/14/2008

Rate: PG&E Res

Fuel Type: Electricity

	STANDARD			PROPOSED			MARGIN		
	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)	Energy Use (kWh)	Peak Demand (kW)	Cost (\$)
Jan	30	0	3	0	0	0	30	0	3
Feb	18	0	2	0	0	0	18	0	2
Mar	14	1	2	0	0	0	14	1	2
Apr	25	1	3	10	1	1	15	0	2
May	83	3	10	3	2	0	80	2	9
Jun	185	4	21	46	3	5	139	1	16
Jul	280	4	32	111	3	13	168	1	19
Aug	259	4	30	102	3	12	157	1	18
Sep	159	4	18	32	3	4	127	1	15
Oct	37	3	4	0	0	0	37	3	4
Nov	15	1	2	1	0	0	14	1	2
Dec	27	0	3	0	0	0	27	0	3
Year	1,132	4	\$ 131	305	3	\$ 35	827	1	\$ 96

Rate: PG&E Gas Res

Fuel Type: Natural Gas

	STANDARD			PROPOSED			MARGIN		
	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)	Energy Use (therms)	Peak Demand (kBtu/hr)	Cost (\$)
Jan	92	43	142	32	33	47	61	10	95
Feb	62	39	95	21	31	29	42	7	66
Mar	48	32	73	12	12	16	36	20	57
Apr	34	33	51	11	4	14	24	29	36
May	18	9	25	10	4	14	7	6	11
Jun	16	4	23	10	3	13	7	1	10
Jul	16	4	23	9	3	13	7	1	10
Aug	16	4	22	9	3	12	7	1	10
Sep	15	4	21	9	3	12	7	1	9
Oct	19	15	27	9	3	13	10	11	15
Nov	45	31	67	10	9	13	35	22	54
Dec	85	38	131	25	30	36	60	8	94
Year	468	43	\$ 699	167	33	\$ 232	302	10	\$ 467

Annual Totals	Energy	Demand	Cost	Cost/sqft	Virtual Rate
Electricity	305 kWh	3 kW	\$ 35	\$ 0.03/sqft	\$ 0.12/kWh
Natural Gas	167 therms	33 kBtu/hr	\$ 232	\$ 0.18/sqft	\$ 1.39/therm
Total			\$ 267	\$ 0.21/sqft	

The values shown here are based upon the results of an EnergyPro Compliance energy analysis that uses Title 24 profiles as specified in the Residential ACM manual.