HYDRONIC HEATING SYSTEM WORKSHEET

CALIFORNIA ENERGY COMMISSION

CEC- CF1R-PLB-01-E

CERTIFICATE OF COMPLIANCE

Note: This table completed by HERS Registry.

Field Name	Data Entry	Field Name	Data Entry
Project Name:		Enforcement Agency:	
Dwelling Address:		Permit Number:	
City and Zip Code:		Permit Application Date:	

A. Pipe Heat Loss Worksheet

01	02	03	04
Pipe Diameter (inches)	Pipe Heat Loss Factor (kBtu/year/ft)	Pipe Length (ft)	Pipe Heat Loss (kBtu/year)

05	Sum of All Pipe Heat Losses (kBtu/year)	
06	Average Hourly Pipe Heat Loss (Btu/hr)	

B. Hydronic System Calculations for Large Storage Gas

Field	Field Name	Data Entry
01	Recovery Efficiency/AFUE of the Water Heater or Boiler (unitless)	
02	Average Hourly Pipe Heat Loss (Btu/hr)	
03	Rated Input of Water Heater or Boiler (Btu/hr)	
04	Standby Loss—Percentage (if known)	
05	Standby Loss—Power (Btu/hr) (from appliance database, if known)	
06	Pump Watts (Watts) (if applicable)	
07	Pump Energy (Btu/hr)	
08	Effective AFUE	

HYDRONIC HEATING SYSTEM WORKSHEET

CALIFORNIA ENERGY COMMISSION

CEC- CF1R-PLB-01-E

Documentation Author's Declaration Statement

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/ HERS Certification Identification (if applicable):
City/State/Zip:	Phone:

Responsible Person's Declaration Statement

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Company:	Date Signed:
Address:	License:
City/State/Zip:	Phone:

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300

CF1R-PLB-01-E User Instructions

A. Pipe Heat Loss Worksheet

1. Pipe Diameter (inches): Enter all the different pipe diameters of the system. User selects from list: 0.75, 1.0, 1.5
2. Pipe Heat Loss Factor (kBtu/year/ft): Using the table below, determine the pipe heat loss factor for the corresponding pipe diameter.
3. Pipe Length (ft): Enter the pipe length.
4. Pipe Heat Loss (kBtu/year): Multiply line B02 by B03, this is the pipe heat loss.
5. Sum of All Pipe Heat Losses (kBtu/year): Enter the sum of all pipe heat loss.
6. Average Hourly Pipe Heat Loss (Btu/hr): Divide line B05 by 8760 times 1000.

Pipe Heat Loss Factor Lookup Table

Pipe Nominal Diameter	Pipe Heat loss factor
0.75	**66.6**
1.0	**78.8**
1.5	**100.3**

B. Hydronic System Calculations for Boiler or Large Storage Gas

1. Recovery Efficiency/AFUE of the Water Heater or Boiler: Enter the Recovery Efficiency/AFUE from manufacturer's literature or the appliance database.
2. Average Hourly Pipe Heat Loss (Btu/hr): Enter average hourly pipe heat loss sum A06.
3. Rated Input of Water Heater or Boiler (Btu/hr)Enter the rated input from manufacturer's literature or the appliance database.
4. Standby Loss – Percentage: Enter the standby loss percent from manufacturer's literature or the appliance database. For example, enter 0.02 if the standby loss is 2%. Can be skipped if unknown
5. Standby Loss – Power: Standby loss energy (from appliance database) is used if standby loss percent is not known. Enter the standby loss energy from manufacturer's literature or the appliance database.
6. Pump Watts (Watts): Enter the pump watts
7. Pump Energy (Btu/hr): Pump energy is line A06 times 3.414. If unknown then default value is 85.
8. Effective AFUE: Effective AFUE is [line A01 – (line A02+ line A05 + (line A07 / line A03)].

Documentation Declaration Statements

1. The person who prepared the CF1R will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature (may be electronic).
2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature (may be electronic).