

**DOCKETED**

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**POOL AND SPA HEATING SYSTEMS**

CEC-CF2R-PLB-03-E (Revised 10/16)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF INSTALLATION		CF2R-PLB-03-E
Pool And Spa Heating Systems		(Page 1 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Dwelling Address:	City:	Zip Code:

**A. Pool and Spa System Type**

01	Pool and Spa System Type	
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**B. Pool and Spa Systems and Equipment Requirements (Section 110.4(a) and 110.5)**

01	Heater has a thermal efficiency that complies with the Appliance Efficiency Regulations.
02	A readily accessible on-off switch is mounted on the outside of the heater, which allows the heater to be shut off without the user adjusting the thermostat setting.
03	A weatherproof plate or card containing instructions for the energy-efficient operation of the pool or spa heater is permanently mounted.
04	No electric resistance heating except for listed package units that have fully insulated enclosures and tight fitting covers that are insulated to at least R-6. Or if documentation is provided that at least 60% of the annual heating energy is from site solar energy or recovered energy.
05	Heating system has no pilot light.

**The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.**

**C. Pool and Spa System Installation Requirements (Section 110.4(b))**

01	To allow for the future addition of solar heating equipment, at least 36" of pipe is installed between the filter and heater, or dedicated suction and return lines are installed, or built-in, or built-up, connections for future solar heating are provided.
02	A cover is provided for outdoor pools or spas that have a heat pump or gas heater.
03	Pool system has directional inlets to adequately mix the pool water.
04	Pool system has a time switch that allows the pump to be set or programmed to run during off-peak periods only.

**The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.**



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**D. Pool Pump Sizing and Flow Rate Specification (Section 150.0(p))**

01	The pool pump specified is listed in the CEC database of certified pool pumps.		
02	The pool pump flow rate shall not exceed the maximum pump flow rate calculated based on pool sizing in the table below. The return pipe diameter, suction pipe diameter, and filter area shall be at least as large as the required minimums shown in the table. Alternatively, a flow calculation or flow test result shall be provided to demonstrate that the pump flow rate is less than 6 hour filtration turnover, and the return pipe flow rate does not exceed 8 fps and that the suction pipe flow rate does not exceed 6 fps.		
03	An alternative compliance calculation or a flow test result is provided for this pool or spa use (must attach flow calculation or flow test result to this form)		
04	The pump is capable of operating at 2 or more speeds (not applicable if pump is less than 1 horsepower).		
05	Each auxiliary pool load is served by either a separate pump, or the system is served by a multi-speed pump.		
06	Volume of Pool (gallons)		
07	Filter Type (Cartridge, Sand, DE)		
	08a Required Min Return Pipe Diameter (inches)	08b Required Min Suction Pipe Diameter (inches)	08c Required Min Filter Area (ft <sup>2</sup> )
			08d Required Max Pump Flow (gpm)
09	Return Pipe Diameter (inches)		
10	Suction Pipe Diameter (inches)		
11	Filter Surface Area (ft <sup>2</sup> )		
12	Max Pump Flow Rate (gpm)		
13	Measured Flow Rate Return Line (fps)		
14	Measured Flow Rate Suction Line (fps)		
15	Compliance Statement:		
<b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b>			

**E. Pool System Piping (Section 150.0(p)2)**

01	The suction side pipe is straight for at least 4 pipe diameters before entering the pump (See table below for the required straight run lengths for various pipe sizes).
02	All elbows are sweep elbows, or an elbow type that has a pressure drop that is less than the pressure drop of a straight pipe with a length of 30 pipe diameters.
<b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b>	

**F. Pool Filters and Valves (Section 150.0(p)3 and 4)**

01	If a filter is used in a pool intended for public use: The size of the filter is at least the size specified in NSF/ANSI 50.
02	If a backwash valve is used: The diameter of the backwash valve is at least 2 inches, or the diameter of the return pipe, whichever is greater.
<b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b>	



CERTIFICATE OF INSTALLATION		CF2R-PLB-03-E
Pool And Spa Heating Systems		(Page 3 of 3)
Project Name:	Enforcement Agency:	Permit Number:
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**DOCUMENTATION AUTHOR'S DECLARATION STATEMENT**

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

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
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:

- The information provided on this Certificate of Installation is true and correct.
- I am either: a) a responsible person eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation, and attest to the declarations in this statement, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
- The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations and the installation conforms to the requirements given on the Certificate of Compliance, plans, and specifications approved by the enforcement agency.
- I will ensure that a registered copy of this Certificate of Installation shall be posted or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a registered copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

**CF2R-PLB-03-E User Instructions****A. Pool and Spa System Type**

Pick from Pool only, Spa only, or Pool and Spa

**B. Pool and Spa Systems and Equipment Requirements** (Section 110.4(a) and 110.5)

Before any pool or spa heating system or equipment may be installed, the manufacturer must certify to the Energy Commission that the system or equipment complies with §110.4 and §110.5. The requirements include minimum heating efficiency according to Appliance Efficiency Regulations, an on-off switch outside the heater, permanent and weatherproof operating instructions, no continuous pilot light, and no electric resistance heating.

**C. Pool and Spa System Installation Requirements** (Section 110.4(b))

A time switch or similar control mechanism must be installed as part of the pool water circulation control system that will allow all pumps to be set or programmed to run only during the off-peak electric demand period and for the minimum time necessary to maintain the water in the condition required by applicable public health standards.

**D. Pool Pump Sizing and Flow Rate Specification** (Section 150.0(p))

The pool filtration flow rate may not be greater than the rate needed to turn over the pool water volume in 6 hours or 36 gpm, whichever is greater. Calculate Max Flow Rate using the following equation:

$$\text{Max Flow Rate (gpm)} = \frac{\text{Pool Volume (gallons)}}{360\text{min.}}$$

Pool piping must be sized according to the maximum flow rate needed for all auxiliary loads. Show work to calculate return and suction line flow rate, minimum filter area, and the maximum pump flow rate correspond to the pool volume in accordance to section 150.0(p), or refer to Table C below for the prescriptive values. The maximum velocity allowed is 8 fps in the return line and 6 fps in the suction line, and the maximum pump flow rate is less than 6 hour filtration turnover.

03 Select whether the alternative calculation is used.

06 Enter the Pool Volume (gal).

07 Enter the Return Pipe Diameter (inches).

09 Enter Suction Pipe Diameter (inches).

10 Enter Filter Type (Cartridge, Sand, DE).

11 Enter Filter Surface Area (ft<sup>2</sup>).

12 Enter the Max Pump Flow Rate (gpm).

13 Enter the measure flow rate of the return line in fps. This is only used if the alternative calculation is used.

14 Enter the measure flow rate of the return line in fps. This is only used if the alternative calculation is used.

15 Verify that an alternative compliance calculation or flow test result is provided for this pool or spa use (D. 03 = Yes), and verify whether D. 13 is less than or equal to D. 08, and D. 14 is less than or equal to D. 06. Indicate Yes or No. If no, project fails prescriptive compliance.

**E. Pool System Piping** (Section 150.0(p)2)

There must be a length of straight pipe that is greater than or equal to at least 4 inches pipe diameters installed before the pump. Refer to Table D below for the required pipe length. Traditional hard 90° elbows are not allowed. All elbows must be sweep elbows or a type of elbow that has a pressure drop less than the pressure drop of straight pipe with a length of 30 pipe diameters.

**F. Pool Filters and Valves** (Section 150.0(p)3 and 4)

Backwash valves must be sized to the diameter of the return pipe or 2 inches, whichever is greater. Multiport backwash valves have a high pressure drop and are discouraged.

**Table C**  
**Pool sizing (Values are based on a maximum allowable turnover rate of 6- hours)**  
 Note: For pumps greater than 1 hp. The maximum Pump Flow is the lowest speed default filtration

Max Pool Volume (gallons)	Min Pipe D or Greater (inches)		Min Filter Area or more (square feet)			Max Pump Flow (gpm)
	Return	Suction	Cartridge	Sand	DE	
13,000	1.5	1.5	100	2.4	20	36
17,000	1.5	2	130	3.1	25	47
21,000	2	2	160	3.9	30	58
28,000	2	2.5	210	5.2	40	78
42,000	2.5	3	320	7.8	60	117
48,000	3	3	360	8.9	70	133

**Table D**  
**Pipe Diameter/Pipe Length**

Pipe Diameter (inch)	Required Pipe Length leading into pump (inch)
1.5	6
2	8
2.5	10
3	12