



# Residential Pool and Spa Requirements

## Permit Requirements

1. All pools and spas, including portable spas, require a permit.
2. Two copies of a site plan and structural plans (gunite pools and spas only) must be submitted with the engineer's stamp on each sheet of the structural plans.
3. The site plan must be fully dimensioned. The site plan must also include details of the existing perimeter fence, the proposed perimeter fence, and the method of controlling access from the dwelling to the pool. If door alarms are proposed, the location and type of alarm must be identified.
4. Homeowners Association approval is required if applicable.

## Pool Location Per Approved Plan

Measurements are taken from the inside wall of the pool or spa; therefore it must be put in place in accordance with the approved plans prior to calling for the first inspection. Any change in location must be approved prior to inspection.

## Pool Enclosure

1. Every pool or spa must be enclosed with a perimeter fence measuring a minimum of 5 feet in height, measured on the side of the fence away from the pool.
2. If the fence is designed with the horizontal members separated by 45 inches or more, the opening between the vertical members may not exceed 4 inches.
3. If the fence is designed with the horizontal members separated by less than 45 inches, the opening between the vertical members may not exceed 1 $\frac{3}{4}$  inches and the horizontal members must be located on the pool side of the fence.
4. All pedestrian access gates shall be self-closing and self-latching, with the latching device located a minimum of 54 inches above grade, and the gates shall swing away from the pool area. All other gates shall be equipped with a locking device.
5. All pool areas are recommended to have at least one pedestrian gate.
6. See City of Vista Ordinance No. 1996-7 for detailed pool barrier requirements. Chain link provisions refer to existing permitted fences only.

## Construction Requirements

All pool construction shall conform to expansive soil details unless a soil report indicates that expansive soils are not present. Use surcharge details as necessary.

## Outdoor Heater Installation

All mechanical equipment shall be secured to a concrete base above grade. Manufacturer's installation instructions must be available on the job site for inspection. The heater vent termination must be a minimum of 4 feet from any door, window or gravity air inlet into any building, measured from the closest edge of the vent. Clearance to any wall shall be per the manufacturer's installation instructions and listing. The heater must have working space at the access door.

## Plumbing

PVC Plastic, schedule 40 pipe and fittings may be used for circulating piping systems. The entire system shall be tested and must hold a static water or air pressure test of not less than 35 psi for 15 minutes. PVC water and air lines must be painted to protect them from ultraviolet rays. A 36-inch minimum accessible pipe is required between the filter and the fossil fuel heater for the future addition of solar heating equipment. Plastic pipe and fittings designed to be joined by solvent cementing shall comply with appropriate IAPMO installation standards. A minimum 2 outlets is required and must be separated by a minimum of 3 feet. An anti-entrapment cover shall cover all outlets. Any pool or spa over 750 gallons requires a minimum 3-inch P-trap and a backwash line. Pools and spas using a cartridge filter may reduce the P-trap size to a minimum of 1 $\frac{1}{2}$ -inch for drainage. If the pool has an auto fill water supply, provide a reduced-pressure principal backflow preventer.

## Gas Piping

### *Metallic Pipe*

May be black or galvanized steel, protected with approved factory applied coating. Fittings and short sections of pipe that are not coated must be primed and wrapped with 10 mil tape to a total thickness of 40 mil. Pipe must be buried 12 inches below grade or 6 inches below concrete. A pressure test is required and must hold 10 psi for 15 minutes. Underground ferrous gas piping shall be electrically isolated from the rest of the gas system with listed or approved isolation fittings installed a minimum of 6 inches above grade.

### *Non-Metallic Pipe*

Non-metallic pipe must be approved PE pipe. Piping and tubing must be labeled with the designated IAPMO certification mark. PE pipe may not be used above ground. The transition from PE pipe to metallic pipe must be made with an approved installation fitting only and be installed in a horizontal position. The horizontal metallic portion of the riser must extend a minimum of 30 inches before connecting to the PE pipe. Piping must be buried 18 inches below grade or 12 inches below concrete. A pressure test is required and must hold 10 psi for 15 minutes. A yellow copper tracer wire (minimum #18 AWG) must be installed with PE gas piping.

Never cover or conceal piping until it has been inspected and approved. Refer to Table 5-1 of the 1997 Uniform Swimming Pool Code to verify correct pipe sizing. Do not install or connect gas lines to a meter or appliance until a pressure test has been approved. A gas shut-off valve is required outside of, and within 3 feet of the heater.

## Electrical

Permanently installed pools and spas must have at least one 125 volt anti tamper convenience receptacle located a minimum of 6 feet from and not more than 20 feet from the inside wall of the pool/spa. Receptacles located with 20 feet of the inside walls of a pool/spa must be protected by a GFCI. A pool light must have a metallic forming shell connected to a pool light junction box with metallic or non-metallic raceway. Where rigid non-metallic conduit is used, a Number 8 insulated copper conductor must be installed. Junction boxes must be located 4 feet minimum from the pool and 8 inches minimum above the flood level or ground level, whichever is greater. The pool light branch circuit must be GFCI protected. Light fixtures closer than 5 feet horizontal from the pool edge must be a minimum of 12 feet above the water level. Any overhead electrical and communication lines must be shown on the plans. Indicate both the height and horizontal distance from the edge of the pool.

**An electrical disconnect shall be accessible, located within sight of the pool, spa, or hot tub equipment, and shall be located at least 5 feet horizontally from the inside walls of the pool, spa, or hot tub.**

To eliminate voltage gradients within the pool area, provide a bonding grid to extend 3 feet minimum horizontally beyond the inside walls of the pool. The bonding grid is to be installed under or within the paved walking surfaces and connected to pool steel.

All other metal parts or components within 5 feet of the inside wall of the pool or spa (including metal straps for posts, metal fences, window and doorframes, etc.), any enclosures (timer cans, switch boxes, etc.), and if a pool light is installed, the housing and junction box thereof shall be bonded with a Number 8 AWG unspliced solid copper conductor.

Electrical conduit may be a minimum schedule 40 PVC plastic if below grade. The conduit must be buried 18 inches below grade or 4 inches below grade when covered with 4-inch concrete. The conduit must be UL listed. Above ground conduit may be PVC plastic (minimum schedule 80), or rigid galvanized steel.

## State Energy Code

All swimming pools/spas with fossil-fuel heaters must contain the following measures mandated by the State Energy Code:

1. System is certified with 78 percent thermal efficiency, on-off switch, weatherproof operating instructions, no electric resistance heating, and no pilot light.
2. System is installed with:
  - a. At least a 36-inch pipe between the filter and heater for future solar heating.
  - b. Cover for outdoor pool or outdoor spa.
3. Pool system has directional inlets and a circulation pump time switch.

**POOL AND SPA HEATING SYSTEMS**

CEC-CF2R-PLB-03-E (Revised 01/16)

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:

<b>A. Pool and Spa System Type</b>	
01	Pool and Spa System Type

<b>B. Pool and Spa Systems and Equipment Requirements (Section 110.4(a) and 110.5)</b>	
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.
<b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b>	

<b>C. Pool and Spa System Installation Requirements (Section 110.4(b))</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.
<b>The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.</b>	

**POOL AND SPA HEATING SYSTEMS**

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CERTIFICATE OF INSTALLATION		CF2R-PLB-03-E
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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>	

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2016 Residential Compliance

January 2016

**POOL AND SPA HEATING SYSTEMS**

CEC-CF2R-PLB-03-E (Revised 01/16)

CALIFORNIA ENERGY COMMISSION



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

<b>DOCUMENTATION AUTHOR'S DECLARATION STATEMENT</b>		
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:	
<b>RESPONSIBLE PERSON'S DECLARATION STATEMENT</b>		
I certify the following under penalty of perjury, under the laws of the State of California:		
1. The information provided on this Certificate of Installation is true and correct.		
2. I am 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 (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.		
3. 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 plans and specifications approved by the enforcement agency.		
4. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.		
5. 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:

Registration Number:

Registration Date/Time:

HERS Provider:

CA Building Energy Efficiency Standards - 2016 Residential Compliance

January 2016

**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