

POOL AND SPA HEATING SYSTEMS

CEC-CF2R-PLB-03-E (Revised 01/20)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF INSTALLATION		CF2R-PLB-03-E
Pool And Spa Heating Systems - For Non-HERS Registered Projects		(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 ²)
			08d Required Max Pump Flow (gpm)
09	Return Pipe Diameter (inches)		
10	Suction Pipe Diameter (inches)		
11	Filter Surface Area (ft ²)		
12	Max Pump Flow Rate (gpm)		
13	Measured Flow Rate Return Line (fps)		
14	Measured Flow Rate Suction Line (fps)		
15	Compliance Statement:		
The responsible person's signature on this compliance document affirms that all applicable requirements in this table have been met.			

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

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



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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 Filter Type (Cartridge, Sand, DE).

08a Enter the Required Minimum Return Pipe Diameter (inches).

08b Enter the Required Minimum Suction Pipe Diameter (inches).

08c Enter the Required Minimum Filter Area (ft²).

08d Enter the Required Maximum Pump Flow (gpm).

09 Enter Return Pipe Diameter (inches).

10 Enter Suction Pipe Diameter (inches).

11 Enter Filter Surface Area (ft²).

12 Enter the Maximum Pump Flow Rate (gpm).

13 Enter the Measured Flow Rate of the Return Line in fps. This is only used if the alternative calculation is used.

14 Enter the Measured Flow Rate of the Return Line in fps. This is only used if the alternative calculation is used.

15 Automatically completed Compliance Statement.

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

CITY OF DANA POINT POOL STANDARD NOTES 2019 CBC

This project shall comply with the requirements of the 2016 series of the California Building Codes, which include the following:

2019 California Building Code;
2019 California Residential Code;
2019 California Mechanical Code;
2019 California Plumbing Code;
2019 California Electrical Code;
2019 California Energy Code;
2019 California Green Building Standards Code;
and the City of Dana Point Municipal Ordinances

NPDES INFORMATION

The discharge of pollutants to any storm drainage system is prohibited. No solid waste, petroleum byproducts, soil particulate, construction waste, or wash water generated on site or by construction activities shall be placed, conveyed, or discharged into the street, gutter, or storm drain system.

The finish grade shall be sloped away from the building for drainage purposes.

DEFINITIONS

GRADE is the underlying surface, such as earth or a walking surface.

ENCLOSURE means a fence, wall or other barrier that isolates a swimming pool from access to the home.

EXIT DOOR ALARMS means devices that make audible continuous alarm sounds when any door or window that permits access from the residence to the pool area that is without any intervening enclosure, is opened or is left ajar. Exit alarms may be battery operated or may be connected directly to the electrical wiring of the building.

POOL BARRIER Includes the perimeter fence separating the pool/spa from the neighboring properties and the adjoining public area.

GENERAL REQUIREMENTS

The sulfate content of most coastal soil is generally "severe" as categorized by the California Building Code section 18.

- Soils reports are required for all pools located at bluff top sites and along Beach Road.
- At all other sites, 4500 psi concrete (shotcrete) with a water/cement ratio of 0.45 and type V cement may be used in lieu of a soils report.
- Pools may be designed and built using less than 4500 psi concrete with a justifying soils report. A letter from a soils engineer, addressing the suitability of the site, the soil sulfides, the corresponding design parameters, and the soils report will be required at time of submittal.
- In all cases, deputy inspection and the appropriate reports are required for all shotcrete placements.
- Shotcrete concrete (wet or dry) shall conform to the following: x Shall have an ultimate compressive strength of 4500 psi. (Unless a soils report recommends an alternate strength).
- Water-cement ration of 0.45.
- Type V cement.

SPECIAL REQUIREMENTS

- All sheets of the final plans and front sheet of the structural calculations, documents and soils reports prepared by a civil, structural or architect shall bear the signature and stamp of the professional engineer or architect, date of signing, and the expiration date of the registration.
 - The Engineer of record shall review and approve the soils report.
- Please note, "Gunite" is a registered trademark name for the dry process of shotcrete. The building code does not recognize "Gunite". All requirements for shotcrete per section 1908 apply to either application.

SWIMMING POOL

Any structure intended for swimming or recreational bathing that contains water over 18 inches (610 mm) deep. This includes in-ground, aboveground and on-ground swimming pools, hot tubs, spas and fixed-in-place wading pools. CBC Section 3109 provisions apply to the design and construction of barriers for swimming pools located on the premises of Group R, Division 3 Occupancies. This includes a body of water over 18" deep where a drowning hazard exists. Ponds or fountains less than 18" deep are exempt from the barrier requirements.

BARRIERS FOR SWIMMING POOLS, SPAS, AND HOT TUBS

Section 3109 of the 2019 California Building Code has been amended to read as follows and includes portions of California Swimming Pool Safety Act (H&S Code 115920-115929):

Section 3109.4.1The top of the barrier shall be at least 60 inches above grade measured on the side of the barrier, which faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade level, such as an above ground pool, the barrier may be at ground level, such as the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches.

Section 3109 Openings in the barrier shall not allow passage of a 4 inch sphere.

Section 3109 Solid barriers which do not have openings, such as masonry or stone walls, shall not contain indentations or protrusions except for normal construction tolerances and tooled masonry joints.

Section 3109 Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal member is less than 45 inches, the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1-3/4 inches in width. Where there are decorative cutouts within vertical member, spacing within the cutouts shall not exceed 1-314 inches in width.

Section 3109 Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches or more, spacing between vertical members shall not exceed 4 inches. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1-3/4 inches in width.

Section 3109 Chain link dimensions. The maximum mesh size for chain link fence may be 2.25 inch square when the fence is provided with slats fastened at the top or bottom, which reduce the openings to no more than 1-3/4".

Section 3109 Where the barrier is composed of diagonal members, such as a chain link or lattice fence, the maximum opening found by the diagonal members shall be no more than 1-3/4 inches.

Section 3109 Access gates shall comply with the requirements of Section 3109 and be equipped to accommodate a locking device. Pedestrian-access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Release mechanisms shall be in accordance with Section 1010.1.8. Where the release mechanism of the self-latching device is located less than 54 inches from the bottom of the gate, (1) the release mechanism shall be located on the pool side of the gate at least 3 inches below the top of the gate and (2) the gate barrier shall have no opening greater than Y, inch within 18 inches of the release mechanism.

Where a wall of a dwelling serves as part of the barrier, **two** of the following **seven** drowning prevention safety features shall apply (Reference Calif. Health and Safety Code 115920-115929):

- Exit alarms on the private single-family home's doors that provides direct access to the swimming pool or spa. The exit alarm may cause either an alarm noise or verbal warning. The alarm shall be UL listed or from an NRTL. The audible alarm shall activate within 7 seconds and sound continuously for a minimum of 30 seconds immediately after the door is opened and be capable of being heard throughout the house during normal household activities. The alarm shall automatically reset under all conditions. The alarm system shall be equipped with a manual means, such as a touchpad or switch, to temporarily deactivate the alarm for one door operation. Such deactivation shall last for not more than 15 seconds. The deactivation switch shall be located at least 54 inches above the threshold of the door. Other means of protection, such as self-closing doors with self-latching devices approved by the building official, shall be acceptable so long as the degree of protection afforded is not less than the protection afforded by the alarm system described above.
- A pool safety cover that complies with ASTM F 1346-91(power or manual operated).
- Other means of protection, if the degree of protection afforded is equal to or greater than that afforded by any of the features set forth above and has been independently verified by an approved testing laboratory as meeting standards for those features established by the ASTM or ASME.
- An enclosure or fence, wall, or barrier that isolates a swimming pool from access to the home.
- Removable mesh fencing that meets ASTM F2286 with gate that is self-closing and self-latching and accommodates a key lockable device.
- A self-closing self-latching device with a release mechanism installed minimum 54 inches from ground/floor on the dwelling unit doors providing direct pool access to pool or spa.
- An alarm placed in a pool/spa which detects and sounds from accidental or unauthorized pool/spa entry. Alarm is to meet ASTM F2208.

Section 3109 Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps, then (1) the ladder or steps shall be capable of being secured, locked, or removed to prevent access or (2) the ladder or steps shall be surrounded by a barrier which meets the requirements of H & S 115920-9.

Section 3109 When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4 inch diameter sphere.

Section 3109 Walls surrounding Indoor Swimming Pool shall not be required to comply with the requirements of Section 3109

Section 3109 Prohibited locations Barriers shall be located so as to prohibit permanent structures, equipment, or similar objects from being used to climb the barrier.

Section 3109 Entrapment avoidance. Suction outlets shall be designed to produce circulation throughout the pool or spa. Single outlet systems, such as automatic vacuum cleaning systems, or other such multiple suction outlets whether isolated by valves or otherwise shall be protected against user entrapment. (See the City of Dana Point Anti-entrapment handout-B084

Section 3109 Sound Attenuation. Filters, heating systems, and pumps installed to serve pool, spa, hot tub, waterfall, or any other body of water, shall be enclosed and soundproofed. An acoustical report prepared by a licensed or approved acoustical professional can be used to substitute for sound wall enclosures as long as the report demonstrates the compliance of the requirements specified in Chapter 11.10 of the Dana Point Municipal Code. Pool equipment located within 5 foot side yard setback may require a "Site Development Permit".

APPROVED SAFETY POOL COVER

Means a manually or power-operated safety pool cover that meets all of the performance standards of the American Society for Testing and Materials (ASTM), in compliance with standard F 1346-91.

ELECTRICAL REQUIREMENTS - Excerpts below taken from CEC Art. 680.

•"No non-pool equipment related UG wiring within 5 ft. of the pool shell edge (CEC 680.10)". No low voltage direct burial wiring within 10 ft. (CEC 411.5(B)

- A Minimum #8 AWG bare solid copper bonding conductor is required.
 - No luminaries, lighting outlets or ceiling-suspended fans shall be located within 5 ft. horizontally and not less than 12 ft. above the water level of the pool. CEC 680.22(b)(1)
 - No electrical switching devices shall be located within 5 ft. of the pool edge. CEC 680.22(C)
 - Where structural reinforcing steel is not available or encapsulated, at least one #8 AWG solid copper conductor secured within or under the perimeter surface and installed 18" to 24", measured horizontally from the inside walls of the pool. CEC 680.26(B)(2)(b).
 - Where the water is isolated by an insulated pool shell and there are no conductive elements in contact with the pool water, an intentional bond of a minimum conductive surface of 9 square inches installed in contact with the pool water and bonded to the equipment bonding grid wait a minimum #8 AWG solid copper conductor. Section 680.26(C).
 - All 15 and 20 ampere single phase outlets supplying pool pumps require GFCI protection whether supplied by a receptacle cord connection or hard-wired to the branch circuit. CEC 680.21(C)
 - Cord connected pool filter pump shall be provided with a GFCI that is integral part of the attachment plug or located in the power supply cord within 12 inches of the attachment plug only for storable pools. CEC 680.31
 - Pool/Spa lights which are low voltage will require 9 sq. in of bonding fitting in the recirculating piping.
 - All metallic items within 5 ft. of the pool edge shall be effectively grounded. This includes, but not limited to:
 - Pool reinforcement steel.
 - Metallic fencing within 5 ft.
 - Metal handrail and base.
 - Exposed patio cover/deck post bases within 5 ft.
 - Pump motors and filters if metallic and/or electronic controlled
 - Deck reinforcing steel.
 - Diving board bases.
 - Motorized pool cover housing.
- All metallic piping and conduit within 5 ft. Pool heaters; ozonaters

PLUMBING REQUIREMENTS

- PVC pipe shall be painted for UV protection. CPC 312.4
- Anti-siphon devices are required on all hose bibs within the pool area. CPC 603.2
- The gas line minimum burial depth of 18". Where protected from damage, the minimum cover shall be 12". When the minimum cover cannot be maintained the gas piping shall be installed in conduit or bridged (shielded) CPC 1210.1.1

ENERGY AND SAFETY REQUIREMENTS

A Pool/Spa solar blanket required. If heater installed.

Glass windows less than 5 feet from pool edge shall be tempered or laminated safety glass (CBC 2406).

A completed installation certificate CF2R-PLB-03-E is required at the time of final inspection (see attachment).

POOL DEMOLITION REQUIREMENTS

- The bottom shall be removed for drainage. I.e. several holes punched through the bottom.
- When the pool coping is removed, it shall be removed to a depth of 18" below the finished grade. (Removal of the coping is not a requirement).
- Removal of any above ground pool plumbing including pumps and heaters.
- When the electrical sub-panel is removed, the electrical sub-feed conductors shall be removed back to the electric service supply location.
- Conversion of the existing pool electrical system to any other use will require a separate permit and approval. An electrical inspection is required to determine if electrically safe. i.e. knock outs and breaker space(s) filled).

- The permit is based on the valuation of the work being done,
- Inspection is required before the pool/spa is filled in.
- The pool/spa must be filled in with sand (type SE25), dirt (compacted to 90%) or gravel.
- If the site will be built upon then a certified compaction report from a recognized soils report lab is required.

FINISH GRADE AROUND THE STRUCTURE SHALL BE SLOPED 2% AWAY FROM THE BUILDING FOR DRAINAGE PURPOSES.

POOL & SPA STANDARD NOTES

2019 CBC

CODE CYCLE

B087- POOL NOTES

FORM NAME

CITY OF DANA POINT

COMMUNITY DEVELOPMENT, BUILDING and SAFETY DIVISION

33282 GOLDEN LANTER SUITE 209 DANA POINT, CA 92629

