

SECTION E UTILITIES

E1. Utilities on Shore

E1.1 Utility lines on shore should be located underground as is appropriate, and to the extent reasonably possible and financially feasible. Such utility lines include potable water, fire suppression, electrical power, telephone, cable TV, Internet, lighting, security systems, aids to navigation systems, natural gas, sanitary sewer and drainage. Utility sizing, location, design and construction must conform to accepted industry practice and all applicable codes and regulations.

E1.2 Landside utilities should be located, designed and installed with consideration given to practical uses of the marina facilities after construction is completed. Utility planning should provide reasonable access for future maintenance, repair, replacement or expansion of utility lines without major disruption of normal marina functions.

E2. General -- Utilities in Marina Berthing Structures

E2.1 All utility lines in marina berthing structures should be installed to provide maximum public safety as well as protection from impacts, mechanical wear and damage, and environmental elements such as heat, water and rodents.

E2.2 Utility sizing and capacity should be determined on the basis of current and projected use demands, anticipating future levels of service and how to reasonably provide it if necessary.

E2.3 No permanent utility lines should be located on and attached to the deck surface of marina docks. Electrical outlets, water supply hose bibbs, and TV jacks are usable only with lines, cords and hoses that are connected between utility boxes and berthed boats. However, they are temporary in nature and function, and should not be permanently attached to the deck surface.



Non-Permanent Utility Lines Across Fingerfloat

E2.4 It is desirable that all utility lines in a floating dock system have not less than 6 inches minimum clearance above the

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water surface under DL only, and not less than 2 inches clearance under DL + ULL + LPL. Depending on the type of dock system, if utilities are placed high within the dock structure, these minimum clearances should not be difficult to meet.

E2.5 Where utility lines pass through structural members within a floating dock system, the holes in the structural members are to be free of rough edges and abrasive surfaces that will cause accelerated wear on the utility lines.

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E3. Potable Water Service on Marina Docks

E3.1 Each potable water line should deliver water to all hose bibbs at a water pressure not less than 35 psi while 10 percent of the hose bibbs are fully open and running. This level of service will meet normal water demands, and help guard against unusually low water pressure during weekends and holidays.

E3.2 ***All potable water lines on marina docks shall be equipped at the shore end with appropriate anti-siphon devices to prevent back flows into the service mains.***

E3.3 A minimum of one (1) standard 3/4 inch hose bibb is to be provided for each berth. ***Each hose bibb shall be fitted with an anti-siphon device to prevent back flows into the supply line.***



Storage Box with Anti-Siphon Hose Bibb

E3.4 Dedicated potable water and fire suppression lines should be provided on marina dock systems. Potable water and fire suppression lines should not be combined.

E3.5 Where risers and hose bibbs are not located on both sides of a fingerfloat, it is acceptable for a water hose to be laid across the width of a fingerfloat to provide potable water to a boat in a berth on the opposite side from the riser and hose bibbs, ***except on accessible berths*** (see E3.7 below).

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E3.6 ***Utility hoses and/or lines, whether permanent or temporary, shall not be allowed across the deck of main walkways or marginal walkways.***

E3.7 ***Where a fingerfloat is part of an accessible route, utility hoses and lines shall not be allowed across the fingerfloat.***

E4. Fire Suppression Systems on Marina Dock Systems

E4.1 It is required that marinas have equipment, systems and sustainable water resources to suppress, control and extinguish fires on boats, docks, buildings,

fueling stations and other marina service centers. It is recommended that the local fire marshal be included in all stages of marina design for both new and alteration projects. This will help ensure that all code requirements are addressed, and will facilitate the smooth and effective inspection and completion of projects.

E4.2 Marina fire protection systems fall into one of the two following types:

Low Volume, Low Pressure -- Emergency First Aid Capability

This type typically consists of a series of fire hose cabinets strategically located on a marina, supplied by lines that deliver water at working pressures up to 60 psi, fire flow rates of 40-60 gpm, and nozzle exit pressures of not less than 40 psi.

High Volume, High Pressure -- Major Capability

This type typically consists of water lines and fire hydrants with working pressures up to 200 psi, and fire flow rates of 500 gpm and up, depending on the length of the lines, and the number and spacing of the fire hydrants.

E4.3 It is recommended that fire lines be dedicated lines, and not connected with potable domestic supply lines on floating docks. This will give greater integrity to the fire lines, and increased control of the water supply in the event of a fire. It will also help guard against cross contamination of water lines from line failures, pressure reductions and/or back flows.

E4.4 Fire lines must be fabricated from materials that will stand up under the required working pressures and temperatures, and be corrosion resistant in a wet environment.

E4.4.1 All pipe fittings and valves used must have a pressure rating not less than the pipe itself. For example, 150 psi rated fittings are sometimes used on 200 psi rated pipe. This will not work on a high pressure fire line if the higher pressures can actually occur during system tests and/or actual fires.

E4.4.2 All pipe, fittings and valves must be of a material that will not soften from the heat of a fire, rupture and/or otherwise fail while being used to fight a marina fire. Therefore, such materials and components must be certified for use in working temperatures as per the local fire marshal.

E4.4.3 All pipe, fittings and valves must be highly corrosion resistant, particularly in coastal marinas subject to salt water and salt air corrosion.

E4.5 Where sharp bends occur in fire lines, restraints must be installed to stabilize the pipe and diminish movement resulting from sudden pressure changes, expansion, contraction and water hammer from valve closures.

E4.6 Fire lines must be located below the marina deck on both low and high pressure systems. This will protect the fire lines from impacts, vandalism, or other

damage that would diminish or destroy utilization of the lines during a fire. Placing fire lines below the deck also protects the public from potential personal injury in the event of a serious high-pressure leak, or a sudden pipe or fitting failure.

E4.7 All fire lines in marina dock systems must be equipped at the shore end with appropriate anti-siphon devices to prevent back flows into the service mains.

E4.8 Where low pressure fire lines and fire hose cabinets are provided, the cabinets are to be located at appropriate spacings and locations to afford immediate protection to all floating structures, boats and equipment in a marina. The spacing should be such that a charged fire hose will be able to reach the outboard end of each fingerfloat in a marina. This level of fire protection is generally understood to be “first aid” fire fighting capability. Marina designers must check with local fire officials and make appropriate provisions for major fire fighting capability in accordance with specific needs and code requirements.



E4.9 The required number of fire hose cabinets per fire supply line will be determined on the basis of the marina layout; local, state and national fire codes; and determinations made by the local fire marshal.



Dock-Side Fire Hose Cabinet

E4.10 Where fire hose cabinets over 27 inches high are located on an accessible route, they shall have recessed handles and locks, and not protrude into the walkway more than 4 inches.

E4.11 Marinas are typically viewed by fire officials as being similar to buildings on shore with regard to the requirements for the provision and maintenance of a reliable clean water source, and high pressure water lines for delivery of water during a fire emergency. There are options in addressing these requirements.

E4.11.1 Charged standpipes will usually be 2½ to 4 inches in diameter, in continuous service at live working pressures up to 200 psi, and have fire hose connections at appropriate locations along the length of the lines. Such a system enables fire fighters to quickly address a fire, even if it is in a remote location in a marina. Where dock systems have long walkways that extend hundreds of feet out from shore, charged lines save the time and energy necessary to carry, roll and charge fire hoses connected to fire hydrants on shore. If it becomes difficult to maintain live working pressures up to 200 psi, an alternative may be to maintain lower pressures of up to 60 psi, which can be boosted by the fire department when needed. However, testing and operational readiness of the system must be maintained at the higher pressure service level.



E4.11.2 Dry standpipes have exactly the same characteristics as charged standpipes, except they are empty until needed. In the event of a fire, the local fire department hooks up a pumper truck to the dry standpipe, charges it to operating pressure, and uses it to deliver water to fight a fire. A dry standpipe system eliminates most of the weight and pressure problems experienced in a charged standpipe system.



E4.12 Drafting fire hydrants are sometimes utilized by waterfront agencies when reliable sources of domestic water are not available via normal water mains and municipal service lines. Water is “drafted” directly from the marina basin and pumped into the water lines for use in fighting a fire. However, a number of problems can arise from use of such a system, and the use of drafting fire hydrants should probably be a last resort option. A better option may be the provision and utilization of portable fire carts that can be taken quickly to any area on a marina. Such carts should be self contained and equipped with gasoline engine driven pumps, adequate hose lengths, locking wheels and foam suppression systems. They are available in a variety of types and sizes.



E4.13 Where fire lines and pipes pass through structural members within a floating dock system, the holes in the structural members must be free of rough edges and abrasive surfaces that will cause accelerated wear on the fire lines.

E4.14 At least one strategically located device for calling the local fire department should be located on the docks in a marina. In cases where a marina consists of two or more dock sections, or marina basins, at least one fire-call device should be provided in each section and/or basin.

E4.15 Marina fueling stations located on marina docks should be equipped with a fire-call device, such as an emergency fire call-box or non-coin operated telephone, located not more than 100 feet from the fuel dispensing equipment.

E4.16 Foam suppression capability should be considered as part of the overall plan for fire safety in new construction and alterations to existing marina facilities.



E5. Electrical Power Services on Marina Dock Systems

E5.1 Each marina developed or improved with loan funds from the Department of Boating and Waterways on or after January 1, 2002, shall have its over-water electrical systems inspected biennially, during the term of the loan, by a licensed electrical contractor or licensed electrical engineer, for compliance with the safety-related provisions of the California Electrical Code.



E5.1.1 If newly constructed, an inspected marina shall comply with all of the California Electrical Code requirements in effect at the time the marina was developed.

E5.1.2 If a marina is improved, the areas of the marina in which electrical improvements were made shall comply with the California Electrical Code in effect at the time of the improvement.

E5.1.3 For the purposes of these required biennial inspections, a marina is a boating facility that meets the following criteria:

- owned and operated privately, or by a local governmental entity;
- consists of seven (7) or more berths; and
- is used by the public primarily for recreational purposes.

E5.2 In addition to the required biennial electrical inspections in E5.1, it is highly recommended that ground integrity testing be performed at least annually in all marinas. The importance of this cannot be overemphasized as it is a life safety issue. Where the electrical ground is compromised, situations can occur that lead to serious personal injury, death by electrocution, and electrical shock drowning. Ground integrity testing can be accomplished with appropriate plug-in testers that confirm the integrity of the ground as well as the polarity of the outlet. The cost of this testing is not prohibitive, and cannot be compared with the exposure to possible tragedy to boaters and marina staff.

E5.3 Marina electrical systems should be adequate to supply the power demands for boat slips, lighting, fuel stations, sewage pumpout stations, buildings, navigation aids, and maintenance and repair work.

E5.4 Accessible utilities in a marina, including electrical power outlets and jacks for telephone and cable TV, shall have unobstructed access, and meet the following reach range heights, measured vertically from the dock surface:

Forward Reach:	15 inch minimum	48 inch maximum
Side Reach:	15 inch minimum	54 inch maximum

E5.5 It is recommended that a minimum of one (1) 120 volt 20 amp outlet be provided at each boat berth, regardless of the length of the berth or the boat that occupies it. Keep in mind this is a minimum recommendation, and that identified site specific power demands may be well above this minimum recommendation.



E5.6 Ground fault circuit interrupters (GFCI) are not required by the NEC on receptacles that supply shore power to boats located at marina berths, wharfs, piers and other similar boating facilities.

E5.7 It is not recommended that GFCIs be provided on electrical outlets for individual boat berths. To do so may invite some or all of the following problems:



- nuisance tripping of the devices
- emotional friction between marina staff and boat owners
- false sense of security
- unnecessary increases in operation and maintenance costs

E5.8 It is highly recommended that dedicated 120 volt 20 amp GFCI power outlets be provided on marina docks for use by maintenance staff. Such dedicated outlets should be provided at logical locations for this purpose, and are required by the NEC to be equipped with GFCIs.

E5.9 Sub-metering of marina electrical outlets is highly recommended. The installation and use of kilowatt hour sub-meters in marinas has a dramatic positive impact on the reduction of electrical power consumption.



E5.9.1 One of the primary requirements is the provision that sub-meters must be located within the vertical range of 30-75 inches, measured from the deck surface to the axis of the sub-meter. The primary purpose for this requirement is to provide safe and adequate access for persons who are required to calibrate and maintain the sub-meters.

E5.10 Marine grade electrical outlets designed and manufactured for reliable use in fresh and salt water environments are to be used to provide electrical power to boat slips. Lower quality electrical equipment manufactured for buildings and dry environments do not function well in marinas.

E5.11 Electrical outlets are often installed in dock storage boxes or electrical power centers located along the edge of walkways and at the head of fingerfloats. The dock storage boxes are also often fitted with potable water supply hose bibbs and jacks for telephone and cable TV service. It is recommended that water supply and electrical services not be installed in the same dock storage box. Storage boxes can be damaged by high winds, impacts from boats entering a boat slip, and impacts from heavy carts being moved on the docks, any of which can result in broken water lines. Water and electrical power in the same storage box is inadvisable.



E5.12 From the electrical outlets, power is supplied to a berthed boat via a portable electrical cord that extends between the outlet and a boat. The portable cord is usually stored on the boat when not in use. Such cords should be rated for this use, including proper plug type, wire size and cord length. A boat in a berth must be tied up such that the normal movement of the boat within the berth will not pull, jerk or damage the outlet, electrical cord or the boat's electrical system.

