



City of Oceanside  
 Building Division  
 300 N Coast Hwy  
 Oceanside, CA 92054  
 760-435-3950

## Electrical Lines, Water Lines, Sewer Lines, Fuel Gas Piping & Heat Ducts Burial & Support Requirements

### MINIMUM BURIAL DEPTH REQUIREMENTS – 2013 CALIFORNIA ELECTRICAL CODE (CEC)

- Burial depth shall be per Table 300.5, 2013(CEC)
- Grounding electrode conductors smaller than #6 shall be installed in rigid metal conduit ,rigid nonmetallic conduit, electric metallic tubing or cable armor
- Electrical conductors that are buried are required to be direct burial wire even when conduit is utilized or approved for wet location
- Electrical conduit and conductors can be placed in the same trench as the water line with the electrical line placed above the water line with a twelve (12 inch earth separation)

### ELECTRICAL CONDUIT SUPPORT REQUIREMENTS

CONDUIT TYPE	CONDUIT SIZE	MAX. DISTANCE BETWEEN SUPPORTS	FASTENING SUPPORT DISTANCE FROM OUTLET BOX, JUNCTION BOX, CABINETS OR FITTING
Intermediate Metal (IMC) 2013 CEC Section 342.30 & Table 344.30(B)(2)	1/2" to 3/4" 1" 1-1/4" to 1-1/2" 2" to 2-1/2" 3" & larger	10 feet 12 feet 14 feet 16 feet 20 feet	3 feet – Can be increased to 5 feet where structural members do not readily permit fastenings within 3 feet
Rigid Metal (RMC) 2013 CEC Section 344.30 2013 CEC Table 344.30 (B)(2)	1/2" to 3/4" 1" 1-1/4" to 1-1/2" 2" to 2-1/2" 3" & larger	10 feet 12 feet 14 feet 16 feet 20 feet	3 feet – Can be increased to 5 feet where structural members do not readily permit fastening within 3 feet
Rigid Nonmetallic (RNC)(PVC) 2013 CEC Section 352.30 & Table 352.30	1/2" to 1" 1-1/4" to 2" 2-1/2" to 3" 3-1/2" to 5" 6" & larger	3 feet 5 feet 6 feet 7 feet 8 feet	All sized 3 feet
Electrical Metallic Tubing (EMT) 2013 CEC Section 358.30 2013 CEC Section 358.30 ex.(1),(2)	All sizes	10 feet	3 feet

<b>CONDUIT TYPE</b>	<b>CONDUIT SIZE</b>	<b>MAX. DISTANCE BETWEEN SUPPORTS</b>	<b>FASTENING SUPPORT DISTANCE FROM OUTLET BOX, JUNCTION BOX, CABINETS, OR FITTING</b>
Flexible Metal Conduit (FMC) 2013 CEC Section 348.30 (A)(B)	All sizes	4-1/2 feet	12"- see exception on lengths less than 3 feet where flexibility is necessary
Liquidtight Flexible Nonmetallic (LFNC) 2013 CEC Section 356.30	All sizes	3 feet - Max. for lengths greater than 6 feet	12 inches
Nonmetallic Sheathed Cable (Romex) 2013 CEC Section 334.30 (NM, NMC, NMS)	N/A	Where permitted by CEC– shall be secured by staples, straps, or similar fittings so designed and installed as not to damage the cable. Secure at intervals not exceeding 4-1/2 feet. Cables run through holes in wood or metal joists, rafters or studs shall be considered to be supported & secured. The cable shall closely follow the surface of the building finish or of running boards.	12 inches
Electric Nonmetallic Tubing (ENT) 2013 CEC Section 362.30	All sizes	3 feet	3 feet
Liquidtight Flexible Metal Conduit (LFMC) 2013 CEC Section 350.30	All sizes	4-1/2 feet	12 inches
Metal Clad Cable (MC) 2013 CEC Section 330.30	All sizes	6 feet – Horizontal Run	12 inches

**2013 CEC Table 300.5  
Type of Wiring Method or Type of Circuit  
MINIMUM COVER REQUIREMENTS**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Location of wiring method or circuit</b>	<b>Direct burial cables or conductor</b>	<b>Rigid metal conduit or intermediate metal conduit</b>	<b>Nonmetallic raceways listed for direct burial without concrete encasement or other approved raceways</b>	<b>Residential branch circuits rated 120 volts or less with GFCI protection and maximum over current protection of 20 amperes</b>	<b>Circuits for control of irrigation lighting, limited to not more than 30 volts and installed with type underground feeder or in other identified cable or conduit</b>
All locations not specified below	24"	6"	18"	12"	6"
In a trench below 2" thick concrete or equivalent	18"	6"	12"	6"	6"
Under a building	0" (in raceway only or **)	0"	0"	0" (in raceway only or **)	0" (in raceway only or **)
Under 4" (minimum) concrete exterior slab with no vehicle traffic. Slab extends no less than 6" past underground installation.	18"	4"	4"	6" (direct burial) 4" (in raceway)	6" (direct burial) 4" (in raceway)
Under street, highways, roads, private alleys, driveways, and parking lots	24"	24"	24"	24"	24"
One and two family dwelling driveways & parking areas & not used for other purposes	18"	18"	18"	12"	18"
Airport Runways	18"	18"	18"	18"	18"

**\*\* or Type MC or Type MI cable identified for direct Burial (New per 2013 CEC).**

**WATER LINE BURIAL REQUIREMENTS – 2013 CALIFORNIA PLUMBING CODE (CPC)**

- All water service yard piping shall be at least twelve (12) inches below grade.
- Plastic water service piping shall have a blue 18 AWG direct burial tracer wire
- The water line shall be approved for potable water use. Copper, PEX, Galvanized Steel, or CPVC water line may be used within a building or structure. PVC water line may be used up to the building or structure foundation and transition to approved pipe.
- Building sewers or drainage piping of clay or materials that are not approved for use within a building shall not be run or laid in the same trench as the water pipes unless both of the following requirements are met:
  - 1) The bottom of the water pipe, at all points, shall be at least twelve (12) inches (305 mm) above the top of the sewer or drain line.
  - 2) The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least twelve (12) inches (305mm) from the sewer or drain line.

Water pipes crossing sewer or drainage piping constructed of clay or materials that are not approved for use within a building shall be laid a minimum of twelve (12) inches (305 mm) above that sewer or drain pipe. 2013 CPC Section 720.0 Note: For the purpose of this section, “within the building” shall mean within the fixed limits of the building foundation. 2013 CPC Section 720.0
- Water lines shall be laid on clean compacted soil and covered with a layer of sand. All rocks shall be removed

**WATER LINE SUPPORT REQUIREMENTS (2013 CPC TABLE 313.4)**

TYPE OF PIPING	PIPE SIZE	MAXIMUM DISTANCE BETWEEN SUPPORTS	
		HORIZONTAL	VERTICAL
Copper tube & pipe	1/2" to 1-1/2" 2" & larger	6' 10'	Each floor – not to exceed 10 feet
CPVC	1/2" to 1" 1-1/4" & larger	3' 4'	Base & each floor. Provide mid-story guides *see below
PEX	All sizes	32"	Base & each floor. Provide mid-story guides
PEX-AL-PEX	All sizes	98"	Base & each floor. Provide mid-story guides
PE-AL-PE	All sizes – Only permitted for cold water inside the foundation wall of any building.	98"	Base & each floor. Provide mid-story guides

**\*see the appropriate IAPMO Standard for expansion & other special requirements.**

**SEWER LINES BURIAL REQUIREMENTS – (2013 CPC)**

- Building sewer lines shall run in practical alignment and at a uniform slope of not less than one-fourth (1/4) of an inch per foot toward the point of disposal.
- Building sewer piping shall be laid on a firm bed throughout its entire length.
- Cleanouts shall be placed inside the building near the connection between the building drain and the building sewer or installed outside the building at the lower end of the building drain and extend to grade. Cleanouts shall also be placed at intervals not to exceed one hundred (100) feet in straight runs and for each aggregate horizontal change in direction exceeding 135°.
- Building sewers or drainage piping of clay or materials that are not approved for use within a building shall not be run or laid in the same trench as the water pipes unless both of the following requirements are met:
  - 1) The bottom of the water pipe, at all points, shall be at least twelve (12) inches (305 mm) above the top of the sewer or drain line.
  - 2) The water pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least twelve (12) inches (305mm) from the sewer or drain line.
 Water pipes crossing sewer or drainage piping constructed of clay or materials that are not approved for use within a building shall be laid a minimum of twelve (12) inches (305 mm) above that sewer or drain pipe. 2013 CPC Section 720.0

Note: For the purpose of this section, “within the building” shall mean within the fixed limits of the building foundation.

**DWV SUPPORT REQUIREMENTS (2013 CPC) TABLE 313.4**

TYPE OF PIPE	MAXIMUM DISTANCE BETWEEN SUPPORTS - HORIZONTAL	MAX. DISTANCE BETWEEN SUPPORTS - VERTICAL
Cast	Type of joint (lead & Oakum) – 5 feet except may be 10 feet where 10 feet lengths are installed. Must support at each horizontal branch connection. 1,2,3	Base & each floor not to exceed 15 feet.
Cast Iron Hubless	Type of Joint (Compression Gasket) – Every other joint unless over 4 feet then supported within 18” of each joint. Support at each horizontal branch connection. 1,2,3,4	Base & each floor not to exceed 15 feet.
PVC/ABS DWV	4 feet and at end of branches or changes in directions 5,6	Base and each floor. Provide mid-story guides. Provide for expansion every 30 feet. 6

Notes

1. Support adjacent to joint, a minimum of 18” (457mm).
2. Brace at a maximum of forty feet (12192mm) intervals to prevent horizontal movement.
3. Support at each horizontal branch connection.
4. Hangers shall not be placed on the coupling.
5. Vertical water lines shall be permitted to be supported in accordance with recognized engineering principles with regard to expansion and contraction, when first approved by the Authority Having Jurisdiction
6. See the appropriate IAPMO Installation Standard for expansion and other special requirements.

**FUEL GAS PIPING BURIAL REQUIREMENTS – 2013 CPC**

- No gas piping shall be installed in or on the ground under any building or structure and all exposed gas piping shall be kept at least six (6) inches above grade and structures.
- Corrugated stainless steel tubing shall be tested and listed in compliance with the construction, installation, and performance requirements of ANSI/IAS LC-1, *Standard for Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing*. [NFPA 54:5.6.3.4] 2013 CPC Section 1208.5.3.4
- All service lines shall be laid on clean compacted soil and shall be covered with a layer of sand before backfilling. All rocks or any substances which would puncture lines shall be removed.
- Plastic pipe shall have a tracer wire (Min. AWG 14) shall be buried (corrosion resistant) with plastic pipe for locating purposes. One end shall be brought above ground at a building wall or riser 2013 CPC Section 1210.1.7.2.

**FUEL GAS PIPING SUPPORT REQUIREMENTS (2013 CPC TABLES 313.1 & 1210.2.4.1)**

TYPE OF PIPE	SIZE OF GAS PIPING	MAX. DISTANCE BETWEEN SUPPORTS - VERTICAL	
		HORIZONTAL	VERTICAL
Steel, brass & tinned copper	1/2" 3/4" or 1" 1-1/4" or Larger	6 feet 8 feet 10 feet	1/2" = 6' 3/4" - 1" = 8' 1 1/4" and > = EVERY FLOOR LEVEL
CSST	Per Manufacturer's Installation Instructions		

**HEATING DUCT SUPPORT REQUIREMENTS**

Heating duct supports – following manufacturer's instructions 2013 CMC 603.5

Flexible duct (Residential Only) – Maximum spacing between supports four (4) feet. Allowed to have 1/2" per foot of sag.

2013 CMC 603.5 Approved factory made air ducts may be installed as set forth in the ANSI/SMACNA 006-2006 HVAC Construction Standards- Metal and Flexible or another approved duct construction standard