City of Oceanside
Building Division
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Electrical Lines, Water Lines, Sewer Lines, Fuel Gas Piping & Heat Ducts Burial and Support Requirements

ELECTRICAL LINES BURIAL REQUIREMENTS-2005 National Electric Code (NEC)

- Direct burial cables shall be buried a total of twenty-four (24) inches
- Rigid metal conduit shall be buried a total of six (6) inches
- Intermediate metal conduit shall be buried a total of six (6) inches
- Rigid nonmetallic conduit (PVC) approved for direct burial shall be buried a total of eighteen (18) inches
- Grounding electrode conductor wire shall be installed in metal conduit or sunlight resistant nonmetallic conduit
- Electrical wires that are buried are required to be direct burial wire even when conduit is utilized or approved for wet location
- Electrical lines 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 lines shall not pass through the footing of a building or structure
- A warning tape/ribbon shall be installed in the trench where direct burial wire is installed. Twelve inches above the underground installation. NEC 300.5(D)(3).

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) 2005 NEC Section 342-30 (A)(B) & 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) 2005 NEC 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 Nonmetallic (RNC)(PVC) 2005 NEC Section 352.30 & Table 352030 (B)	1/2” to 3/4” 1-1/4” to 2” 2-1/2” to 3” 3-1/2” to 5” 6” & larger	10 feet 12 feet 14 feet 16 feet 20 feet	All sized 3 feet
Electrical Metallic Tubing (EMT) 2005 NEC Section 358.30 (A)(B)	All sizes	10 feet	3 feet

CONDUIT TYPE	CONDUIT SIZE	MAX. DISTANCE BETWEEN SUPPORTS	FASTENING SUPPORT DISTANCE FROM OUTLET BOX, JUNCTION BOX, CABINETS, OR FITTING
Flexible Metal Conduit (FMC) NEC Section 348.30 (A)(B)	All sizes	4-1/2 feet	12”- see exception on lengths less than 3 feet where flexibility in necessary
Flexible Metal Conduit (FMC)	All sizes	4-1/2 feet	12”- see exception on lengths less than 3 feet where flexibility in necessary
Liquidtight Flexible Nonmetallic (LFNC)	All sizes	3 feet - Max. length of 6 feet	12 inches
Nonmetallic Sheathed Cable (Romex) NEC Section 334 (NM, NMC, NMS)	N/A	Where permitted by NEC – 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) NEC Section 362	All sizes	3 feet	3 feet
Liquidtight Flexible Metal Conduit (LFMC) NEC Section 350	All sizes	4-1/2 feet	12 inches
Metal Clad Cable (MC) NEC Section 330.30	All sizes	6 feet – Horizontal Run See exception for unsupported cables.	12 inches

2005 NEC Table 300.5 Type of Wiring Method or Type of Circuit					
	1	**2**	**3**	**4**	**5**
Location of wiring method or circuit	***Direct burial cables or conductor**	**Rigid metal conduit or intermediate metal conduit**	**Nonmetallic raceways listed for direct burial without concrete encasement or other approved raceways**	**Residential branch circuits rated 120 volts or less with GFCI protection and maximum overcurrent protection of 20 amperes**	**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**
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)	0”	0”	0” (in raceway only)	0” (in raceway only)
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”

WATER LINE BURIAL REQUIREMENTS – 2007 CALIFORNIA PLUMBING CODE (CPC)

- All water service yard piping shall be at least twelve (12) inches below grade.
- The water line shall be approved for potable water use. Copper, PEX, 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. The use of PEX must be approved by the use of an "Alternate Material Form".
- Water piping shall not be ran or laid in the same trench as the sewer line unless all requirements of 2007 CPC Section 720.0 are met.
- Water piping can be ran in the same trench as the electrical line with the water piping below the electrical lines with a twelve (12) inch earth separation.
- Water line crossing sewer shall have a min9imum of 12" earth separation. Water line shall be laid on clean compacted soil and covered with a layer of sand. All rocks shall be removed.

WATER LINE SUPPORT REQUIREMENTS (2007 CPC TABLE 3-2)

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

SEWER LINES BURIAL REEQUIREMENTS – (2007 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.
- Building sewer lines **shall not** be placed in the same trench as electrical and water lines.
- Changes in direction of drainage pipes shall be made with approved fittings - 45° wye fitting. Recommend using long sweep 45°. CPC Section 706.

SEWER LINE SUPPORT REQUIREMENTS (2007 CPC)

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

FUEL GAS PIPING BURIAL REQIREMENTS – 2007 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.
- All horizontal metallic piping shall have at least twelve (12) inches of earth cover. Plastic gas piping shall have at least eighteen (18) inches of earth cover.
- 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. 2007 CMC Section 1311.1.7 (c)

FUEL GAS PIPING SUPPORT REQUIREMENTS (2007 CPC TABLES 3-2 & 12-3)

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	Every floor level
Tubing – Smooth Wall	1/2” 5/8” or 3/4” 7/8” or 1”	4 feet 6 feet 8 feet	Every floor level

HEATING DUCT SUPPORT REQUIREMENTS

Heating duct supports – following manufacturer’s instructions

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