

SECTION 16190
SUPPORTING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Support and align all raceways, cable trays, wireways, cabinets, boxes, fixtures, equipment, etc., in an approved manner.
- B. Supports shall be in conformance with the requirements of the current building codes and local amendments, or the requirements of this Section, whichever is more stringent.
- C. Seismic anchorages, seismic restraints, and fixture and equipment supports shall be in accordance with the National Uniform Seismic Installation Guidelines (NUSIG).

PART 2 - PRODUCTS

2.1 MATERIAL, GENERAL

- A. Support raceways on approved types of wall brackets, ceiling trapeze hangers, or malleable iron straps. "Perforated plumbers strap" not permitted as means of support.
 - 1. Acceptable manufacturer's of support brackets and hangars: "Unistrut", "Kindorf" or "B-line".
 - 2. "Caddy" fasteners are permitted for support of conduit to concealed metal studs and for conduit concealed above suspended acoustical ceilings.
 - 3. All supporting devices located outdoors or in areas subject to moisture shall be hot-dip galvanized or stainless steel.
- B. Do not support raceways or equipment from ceiling tie wire or T-Bar, piping or ductwork. Support independently. Exceptions: Outlet boxes located in suspended ceiling systems (e.g., ceiling speaker boxes) as specifically noted in Section 16131 and light fixtures as specifically noted in this Section.
- C. Provide safety wires (a minimum of two 12 gauge hangers) or equivalent chains for each light fixture weighing less than 56 pounds installed in T-Bar or other ceiling suspension systems. Safety wires and chains shall be securely attached to diagonally opposite corners of each fixture and to structure. Fixtures weighing 56 pounds or more shall be supported from structure.
- D. Surface mounted lighting fixtures supported from T-bar grid shall be attached to the grid with a positive clamp device that completely surrounds the supporting member similar to Caddy "IDS". Provide safety wires as specified in the foregoing.
- E. Provide safety wires (a minimum of two 12 gauge hangers) or equivalent aircraft cable for each pendant mounted fixture. Hangars or cable shall be securely attached to fixture, then routed through stem and securely attached to structure.
- F. Earthquake Anchorages
 - 1. Anchor all equipment, raceways, cable trays, etc., to the building structure to resist earthquake forces in accordance with the requirements of the National Uniform Seismic Installation Guidelines for Architects, Engineers, Inspectors and Contractors.

2. Total lateral (earthquake) force shall be not less than 1.00 times the equipment weight acting laterally in any direction through the equipment center of gravity. Provide adequate backing at structural attachment points to accept the forces involved.
3. Provide equipment supported by flexible isolation mounts with earthquake restraining supports positioned as close to equipment as possible without contact in normal operation (earthquake bumpers). The maximum lateral displacement due to the computed earthquake force from above shall not exceed 1.5 inches. Floor mounted equipment weighing less than 2,000 pounds may have one 6 by 6 by 3/8 by 18 inch steel angle bolted to the floor with four 5/8 inch diameter bolts placed on each of four sides of the equipment.

2.2 HARDWARE COMPOSITIONS AND FINISHES

- A. In dry indoor areas, all threaded fasteners and associated hardware shall be steel, with a zinc or cadmium-plated finish.
- B. In general, fasteners in outdoor, damp, or corrosive environments shall be of the largest trade size that will fit the item being fastened, shall have the coarsest threads commercially available in that size, and shall be hot-dip galvanized steel. Zinc electroplate will be acceptable only in the smaller sizes where hot-dip galv is not commercially available. On metal construction, install with the full length of the threads and the hole wet with cold galv touch-up compound (Z.R.C. or accepted equal).
- C. Where PVC, liquidtight flex, or plastic-coated conduit is installed on wood construction in outdoor, damp, or corrosive environments, fasteners shall be made of monel or a stainless steel alloy suitable for marine environments, such as alloys 430, 446, 18-8, 304, 316, or 347.

2.3 STRUT

- A. U-channel strut for use in heated indoor areas shall be steel. For installations that will be finish painted as part of the project, factory finish of the strut shall be paintable galvanizing, or phosphatized and primed. For installations that will not be finish painted, the factory finish of the strut shall be galvanized.
- B. For outdoor installation of galvanized conduits and boxes, strut shall be steel, with hot-dip galvanized finish. All field-cut ends and other breaks in the finish shall be thoroughly treated with cold galv touch-up compound (Z.R.C. or accepted equal).
- C. U-channel strut for support of PVC or plastic-coated conduits in outdoor, damp, or corrosive environments shall be fiberglass, RobRoy "Rob-Glass" or accepted equal, assembled with the manufacturer's standard end sealant and corrosion-protected hardware and accessories.

PART 3 - EXECUTION

3.1 FASTENING

- A. Secure boxes, wall brackets, cabinets, and hangers by means of toggle bolts in hollow masonry; preset inserts or expansion bolts in solid masonry and concrete; machine screws, bolts or welding on metal surfaces; and wood or sheetmetal screws in wood construction. Obtain permission from ANC before using any type of powder powered studs.

3.2 FIXTURE SUPPORTS

- A. For other than T-bar ceiling fixtures and for all fixtures weighting more than 56 pounds, support luminaires from structural members capable of supporting total weight, under seismic conditions and independently from wiring system. Attach to steel members by approved beam clamps and rods.

3.3 PENDANT FIXTURES

- A. Loop and hook or swivel hanger assemblies for pendant fixtures shall be fitted with a restraining device to hold the stem in the support position during earthquake motions. Pendant-supported fluorescent fixtures shall also be provided with a flexible hanger device at the attachment to the fixture channel to preclude breaking of the support. The motion of swivels or hinged joints shall not cause sharp bends in conductors or damage to insulation.

3.4 ASSEMBLY MOUNTED OUTLET BOX

- A. A supporting assembly that is intended to be mounted on an outlet box shall be designed to accommodate mounting features on 4-inch boxes, 3-inch plaster rings, and fixture studs.

3.5 WALL-MOUNTED EMERGENCY LIGHT UNIT

- A. Each wall-mounted emergency light unit shall be secured in a manner to hold the unit in place during a seismic disturbance.

3.6 SAFETY WIRES

- A. Attach safety wires to lighting fixtures so that no part of the fixture, in event of ceiling suspension system failure, will drop more than six inches below normal ceiling height. Each end of each wire shall be secured with a minimum of three tight wraps.

3.7 STRUCTURAL ATTACHMENTS

- A. Provide adequate backing at structural attachment points to accept the forces involved.
- B. Attachment to plaster or gypsum board not permitted unless specifically approved in writing by ANC on a case-by-case basis. Where approved, such attachment shall be by means of molly or toggle bolts.

END OF SECTION