PART 1 - GENERAL

1.01 WORK INCLUDED

1. Conduit and Equipment Supports
2. Fastening Hardware
3. Luminaire Supports

1.02 COORDINATION

Coordinate size, shape, and location of concrete pads.

1.03 QUALITY ASSURANCE

Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.01 MATERIAL

A. Support Channel: Galvanized or Painted Steel or Aluminum (Interior). Aluminum or Stainless Steel (Exterior).

B. Hardware: All exterior hardware (nuts, bolts, screws, washers, etc.) shall be stainless steel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Fasten hanger rods, conduit clamps, outlets, and junction boxes to building structure using expansion anchors, beam clamps, or spring steel clips. All supporting devices and hardware shall be UL listed for that purpose and per other sections of this specification. In no case will the support device be less than this specification or the manufacturer’s requirements and standards for the equipment/material to be supported.

B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

C. All raceways shall be independently supported to building structure. Do not use boxes with attached conduit brackets as sole conduit support.

D. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

E. Do not use powder-actuated anchors.

F. Do not drill structural steel members. Limited to strapping conduit. All other holes shall have Structural Engineer’s approval prior to cutting or drilling.

G. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

H. In wet locations, install free-standing electrical equipment on concrete pads.

I. Install surface-mounted cabinets and panelboards with minimum of four (4) anchors.

J. Bridge studs (top and bottom) with channels to support flush-mounted cabinets and panelboards in stud walls.

K. Safety of Overhead Materials, Fixtures, and Equipment (Reference Specification Section 26 51 13, Luminaires):

1) Troffer or Lay-In Fixtures

Typical 2' x 4', 1' x 4', and 2' x 2' lay-in light fixtures shall be independently supported at all four corners with a minimum #12 solid galvanized wire to building structure (i.e., four (4), independent, support/tie wires to each fixture). Support wires shall not exceed 45º angles to support means.

2) Surface Mounted Fixture

a) Each surface mounted fixture on plaster ceiling shall be secured to lighting outlet box.

b) Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. (i.e., four (4), independent, support/tie wires to each fixture, or ¼” all thread to bar joist or to unistrut bolted to bar joist). Support wires shall not exceed 45º angles to support means.

3) Pendant Mounted/Suspended Fixture

a) Grid Ceilings: Each pendant mounted fluorescent light fixture shall be independently secured by a secondary and supplementary system of two (2) wires from the canopy and support system of each pendant leg of such fixtures to the building's structural framing above.

b) Plaster Ceilings: Each surface mounted fixture on plaster ceilings, shall be secured to lighting outlet box and shall be installed with two (2), ¼” threaded rods (one on each end) secured to structural ceiling joists.

c) Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaires at indicated height.

4) Recessed Fixtures

a) Grid Ceiling: Each recessed fixtures shall be independently supported at all four corners with a minimum #12 solid galvanized wire to building structure (i.e., four (4), independent, support/tie wires to each fixture). Support wires shall not exceed 45º angles to support means.

b) Plaster Ceilings: Support recessed luminaires in hard ceiling directly from building structure. (i.e., four (4), independent, support/tie wires to each fixture). Support wires shall not exceed 45º angles to support means.

5) Wall Mounted Fixtures

Each wall mounted fixture shall be secured to lighting outlet box and shall be installed with either two (2) ¼" 20 toggle bolts, or tapcons or metal screws secured to block or stud walls.

6) Exit Signs

Install exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend exit sign at indicated height. Outlet box shall be supported by T-Bar hanger with one tie wire to structural support.

7) Emergency Battery Packs

Each wall mounted, emergency batter pack shall be secured to outlet box and shall be installed with either two (2) ¼" 20 toggle bolts, or tapcons or metal screws secured to block or stud walls.

8) Any incandescent (or other fixture) shall be independently secured by a secondary and supplementary system of one (1) wire from the fixture can or canopy and support system of each such fixture to the building's structural framing above.

9) Other similar equipment (heavy speakers, etc.) shall be similarly secured with and independent secondary and supplementary support system.

10) Connection to structure, fixtures, equipment:

a) Wire shall penetrate the cans or canopies of light fixtures and equipment or otherwise connect to such in a fool-proof and positive manner. Wire shall loop through structural framing members above. Wire shall be turned back onto itself and be given two (2) minimum full twists with at least one inch (1") tail remaining beyond the twist. Wire kinked or evidencing failure at twists or elsewhere shall be replaced. Wire shall be installed in a taut fashion (not slack).

b) Wire rope and cable shall penetrate or pass through a portion of the fixture or equipment in a manner adequate to sustain the force developed by the fixture or equipment should it drop or fail. Wire rope and cable shall be either turned back into itself or continue into a complete loop until it lays beside-itself. Wire rope and cable shall be secured to itself with a minimum of two (2) each swagings or clips, fully tightened. A minimum of one inch (1") tails shall protrude after tightening of the clamping device.

c) Chain shall pass through a portion of the fixture or equipment in a manner adequate to sustain the force should the fixture or equipment drop or fail, or should the primary support system fail or fall. Chain shall be secured to the fixture or equipment and to the building's structural framing by means of special links, shackles, or fittings.

d) Wire, chain, wire rope, and cable shall be installed as nearly vertical as possible and in no event at an angle of more than 45 degrees from the vertical.

11) Materials

a) General Specifications for Chain: Equivalent to Campbell Chain Company's specified system of steel, electrically welded standard finish (do not galvanize or electroplate) in continuous lengths. Comply with manufacturer's recommendations.

b) Drop Forged Chain Fittings (eye bolts, pad eyes, inks, chain shackles, snaps, anchor shackles, swivels, turn buckles): Of the same materials and finish as the chain and of the same or greater working load limits, of the same manufacturer or as may be specifically recommended by the chain manufacturer.

c) General Specifications for Wire: 12-gauge galvanized annealed steel wire (multiple strands of lesser gauge will not be considered acceptable). Each wire shall, itself, be looped through the building structural framing above and not to other wiring systems. The angle of the wires shall be kept as vertical as possible and not over 45 degrees from the vertical.

d) Cable for Exposed-to-Public-View-Applications: Where suspended chandeliers, light fixtures, or special equipment occurs, stainless steel flexible aircraft cable or stainless steel flexible marine cable, 302/304, as manufactured by Paulsen, or equal, or Sailbryte as manufactured by Macwhyte corrosion resistant stainless steel or better, right regular lay, in continuous lengths, shall be used. Comply with manufacturer's recommendations.

e) Forged and other stainless steel fittings for stainless steel aircraft or marine cable (turnbuckles, swagings, Nicro-Press sleeves, wire rope clips, use only in concealed positions), connecting links shoulder rivets, jaw fittings, eye fittings, lifting eyes, thimbles, swivels, eye nuts, heavy thimbles, clevis nuts, eye pads, shoulder pins); of same material, of same or greater working loads limits as the cable, of the same manufacturer or as recommended by the cable manufacturer, of type 304/316 electro-polished finish, drop forged, non-magnetic (when available for particular fitting). Manufactured by Merrill or equal. See Workmanship paragraph below.

f) Stainless steel cable for loads (per cable) not exceeding 100 lbs.: 3/32" 7x19 with tensile load limit of 920 lbs. minimum.

g) Stainless steel cable for loads (per cable) not exceeding 500 lbs.: 3/16" 7x19 with tensile load limit of 3,700 lbs. minimum.

h) Workmanship: Stainless steel cable is required to be used only in areas where such is exposed to "public view;" therefore, only fittings designed for cold swaging or Nicro-Press fittings or swagless terminals such as Macwhyte Norseman Terminals are to be used whereby no wire ends, nuts, pins, or cotter keys, or clips are visible. Swaging shall be done only with a rotary swager (not a roll swager). Manufacturer's recommendations and specifications shall be adhered to. Pertinent portions of the booklet Wire Rope Facts published by Banks Wire Rope and Sling, Inc. (available in Tampa) and Construction Care and Maintenance of Marine Rigging by Macwhyte Wire Rope Company (available at the Lazzerette Company) which may pertain also to stainless steel cable, shall be adhered to.

**END OF SECTION**