

	DEPARTMENT OF ADMINISTRATIVE SERVICES POLICY MANUAL ISSUING DIVISION: FACILITIES DIVISION	NUMBER 125-6-211
APPROVAL: C. David White, Administrator		EFFECTIVE DATE March 07, 2002
SUBJECT: TECHNICAL STANDARDS FOR REMODELING AND MODIFICATIONS OF OFFICE BUILDINGS		PAGE 1 OF 4

Basic Policy:

Modifications to DAS owned or operated buildings must support building surfaces, structures, and systems; conform to codes and be safe for occupants. They must be cost effective in design, construction, installation, maintenance, and operation. For those reasons, DAS maintains and requires conformance to Technical Standards that exceed state and local minimum codes.

I. ELECTRICAL STANDARDS

A. Methods

1. Splices shall occur only in approved junction boxes or gutters
2. All cables and branch circuit wiring shall be marked with an approved permanent means of identification (such as Brady or Panduit labeling machine). Labels should be at each end and each junction point to indicate panel and circuit number.
3. All junction boxes shall be labeled with panel and circuit number.
4. All Switch and receptacle covers shall be labeled with panel and circuit number. Labels shall be made by machine (such as P-touch labeler) at least 1/2 inch wide.
5. All receptacles shall be at least 20-amp spec grade, with metal yokes.
6. All receptacle cover plates shall be stainless steel unless otherwise noted.
7. All wire for conduit and cable ceiling supports shall be at least 9-gauge wire and shall be supported independently at each end.
8. All junction and pull boxes shall be properly sized and approved for their purpose according to the National Electrical Code (NEC).

B. Conduits and Raceways

1. All conduits shall be GRC, IMC, EMT or PVC Schedule 40 or higher.
2. All flexible conduit used outdoors shall be UV rated liquid-tight steel flex.
3. All flexible conduit used in mechanical rooms and electrical rooms shall be liquid-tight flex. Steel flex may be used in all other locations requiring flexible conduit.
4. All rigid or flexible conduit shall be at least 1/2" minimum.
5. All conduit fittings shall be steel with insulated throats using set screws or compression connectors. (No die-cast fittings will be allowed.)
6. Conduit fill shall be based on a maximum of 30 percent for all sub panel feeder and branch circuit conduits to allow for expansion.
7. All Condulets shall be Galvanized iron or PVC. Aluminum and Die cast are not permitted.
8. All boxes shall be at least 2 1/8 inches deep and 4" square unless otherwise noted.

9. All metal boxes shall have a grounding pigtail installed.
10. All conduit runs shall have at least one grounding conductor installed.
11. All conduit runs from a panel shall be at least 3/4-inch diameter.
12. A minimum of (3) 1-inch diameter spare conduits shall be stubbed up above ceiling height from panels that are not surface mounted.
13. All GRC and IMC conduit shall have plastic bushings installed.
14. All conduit fittings and locknuts shall be steel.
15. A maximum of 270 degrees of bend shall be allowed between pull points in conduit run.
16. All conduit runs greater than 100 feet shall have at least one pull point per 100 feet of conduit.
17. All conduit and cables are to be run parallel and perpendicular to structure, with no diagonal runs.

C. Wiring

1. Type AC and MC cable be only be used by special approval.
2. All conductors for panel feeders and branch circuits shall be copper and stranded.
3. Conductors for main service feeders may be aluminum by special permission, but if used, they shall have installed non-reversible compression adapters on both ends of each conductor.
4. All cables entering and leaving boxes where exposed shall be installed with 2 screw steel connectors, metal chase nipple or an approved equivalent. Snap in plastic bushings are not approved for use.
5. Neutrals shall be oversized at least one wire size gauge to minimize harmonics.
6. All splices in #8 and larger shall be non-reversible crimp type. Set screw splices are not approved for use.
7. All connections for motors above one horsepower shall be made with non-reversible compression lugs and bolted in place.

D. Wire color-coding

1. Switch legs shall be pink.
2. Travelers for three and four way switches shall be purple.
3. 120/208 color code shall be black, red, blue and white
4. 480/277 color code shall be brown, orange, yellow and white w/ tracer
5. Multi-wire branch circuits must have separate neutrals and shall use tracers on neutrals to help differentiate between circuits.

E. Panels

1. All panels and panel boards shall be 42 circuit to allow for expansion and filled with breakers (except by approval for specific needs).
2. All circuit breakers are to be of bolt in type and SWD rated.
3. Panel boards and panels locations shall not interfere with ingress and egress through doorways or exits.
4. Panel boards shall be at least 6 inches deep with solid top and bottom. Pre-punched knockouts are not approved for use

5. Panel boards and switchboards shall use copper busses.

F. Transformers

1. Transformers shall have copper windings.

G. Switch gear

1. All disconnects shall be heavy-duty rated.

H. Lighting

1. All fluorescent fixtures shall use electronic ballast's and contain T-8/850 ECO bulbs.
2. Fluorescent fixtures using standard straight lamps shall be equipped with cam lock style sockets. (VS-100500, VS-100600 series, ALP brand LH 202 or 203 series) or other equivalent.
3. Use of a building-wide single inverter for emergency lighting is preferred.

II. LOW VOLTAGE CABLING STANDARDS (Fire, Telephone, Data, Security, Etc.)

A. Fire, Telephone, Data, Security

1. All work shall comply with current standards NEC , NFPA and any current ANSI standards such as TIA/EIA 568 A & B , 569, 606 and 607.
2. Permits shall be obtained for all work through the authority having jurisdiction, and shall be copied to DAS Facilities.
3. All conduits for fire alarm, data, and security shall have steel connectors with insulated throats installed on both ends of the conduit run.
4. All wiring in mechanical or electric rooms shall be in conduit.
5. Security, data, or fire alarm cables that are exposed, (below ceilings) shall be protected by a raceway, except on backboards provided for the purpose.
6. Either messenger conduits or an approved support (such as Caddy supports) shall independently support all security, data, and fire alarm.
7. Where possible, data, security and telephone wiring shall be installed in cable tray to allow for expansion.
8. All cables, no matter what length, shall be labeled at both ends with a machine-produced label, indicating location of both termination points (floor, room, etc.).
9. All cabling installed in environmental air spaces shall be plenum rated per current NEC and NFPA.
10. When Interduct is used, it shall be plenum rated where used in environmental air spaces.
11. All unused cabling shall be removed and not abandoned in place.

B. Low Voltage Cabling Outer Jacket Color code

1. Voice shall be White
2. Computer Data from Patch Panel to Field Device shall be Blue
3. Computer Data from Router or Switch to Patch Panel shall be Pink

4. Building Automation System (HVAC) LAN shall be Yellow
5. Building Automation System Riser shall be Purple
6. Building Automation Lighting shall be Orange
7. Low Voltage Cables for Electronic Security Access (card key and keypad access systems) shall be Green
8. Fire Alarm cabling shall be red