**SECTION 27 05 33.41**

**RACEWAY AND BOXES FOR AUDIO-VIDEO SYSTEMS**

**BASED ON DFD MASTER ELECTRICAL SPEC DATED 03/21/22**

This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

This section includes language relevant to multiple divisions of work (26, 27 and 28) and may be referenced in specification sections for those divisions of work. Coordinate content of this section with the AV design team. The intent is that the AV design team edits this section, coordinating with the electrical design team as required.

This section is included in Division 27 as a means for AV Systems designers to include any special box requirements in the specifications. I you feel that the AV-related boxes should be the responsibility of Div. 26, it’s acceptable to change the section # (e.g., to 26 05 33.41). Make sure you coordinate this with whomever is responsible for the Div. 26 documents and change the references to the section found in various other sections.

1. GENERAL

Scope

This section supplements specification Section 26 05 33 – Raceway and Boxes for Electrical Systems and includes content specific to Audio-Video scope. Included are the following topics:

[PART 1 - GENERAL](#_Toc64984492)

[Scope](#_Toc64984493)

[Related Work](#_Toc64984494)

[References](#_Toc64984495)

[Submittals](#_Toc64984496)

[PART 2 - PRODUCTS](#_Toc64984497)

[General](#_Toc64984498)

[Surface Metal Raceway](#_Toc64984499)

[Surface Nonmetal Raceway](#_Toc64984500)

[Floor Boxes](#_Toc64984501)

[Poke‑Through Assemblies](#_Toc64984502)

[Boxes for Audio-Video Equipment](#_Toc64984503)

[PART 3 - EXECUTION](#_Toc64984504)

[Raceway Installation](#_Toc64984505)

[AV Box Installation](#_Toc64984506)

Related Work

Section 26 05 33 – Raceway and Boxes for Electrical Systems

Section 27 41 00 - Audio-Video Systems

References

General

See specification Section 26 05 33 – Raceway and Boxes for Electrical Systems

AV-Specific

Avixa AV/IT Infrastructure Guidelines for Higher Education-No Document Number Published

Avixa Cable Separation Guidelines-F502.

Structured Cabling and Infrastructure

See specification Section 27 10 00.

Submittals

Per Division 1 and specification Section 26 05 33.

Mockups –On request, provide mockups of Floor Boxes, Poke Through Assemblies an Boxes for Audio-Video Equipment to demonstrate configuration, capacity and aesthetics and to set quality standards for fabrication and installation. Coordinate with Power and Structured Cabling requirements as applicable to include all device plates and example connecting cords.

1. PRODUCTS

Review the project requirements and edit to include new AV-specific content. Delete content that does not apply to this project.

General

The following identifies AV-specific requirements for various Raceway and Box types and are in addition to or supplement those identified in specification Section 26 05 33.

Surface Metal Raceway

Insert AV-specific content here.

Surface Nonmetal Raceway

Insert AV-specific content here.

Floor Boxes

Insert AV-specific content here.

Poke‑Through Assemblies

Insert AV-specific content here.

Boxes for Audio-Video Equipment

Flat Screen Display Boxes

The AV Systems Installer shall provide a recessed in-wall box for mounting behind flat screen displays, allowing the screens to sit flush against the wall mounting bracket. See approved AV specifications and drawings for specific make and models to be assumed. These boxes shall provide a neat and secure environment for the audio, video, control, and power connections.

The box shall install easily between any two standard studs in the wall.

The box shall support connections and cable entry on the top or the bottom.

A cover shall be provided and shall be suitable for painting. The cover shall have a cable exit slot for the display connections and the excess cable can easily be hidden inside of the box making the entire installation as clean as possible. The cover screws onto the front of the box once all connections are in place.

Color: [White][Black]

If recessed in-wall box is for future wall mounted displays. Provide cover for entire box opening no open slot for wiring.

The box shall be designed for [new][existing] construction. Brackets shall be included for mounting to studs in new construction.

See AV specifications and drawings for raceway requirement at each box.

Insert construction, dimensions, and capacity information here.

Add content covering other AV Box Type(s) applicable to the project.

1. EXECUTION

Raceway Installation

General

Coordinate configuration, pathways and installation timeline with for raceway and boxes common to power, network and AV.

AV System Raceway Installation

Raceway requirements for AV systems cabling may differ from those of other trades. It is important that the Division 26 contractor become familiar with these specialized requirements and coordinate with Division 27 AV Systems Installer.

Coordinate all box installations with the AV Systems Installer at heights and locations as indicated on the drawings.

Enclose AV systems cabling within continuously grounded ferrous metallic raceway.

*Exception*: PVC shall be acceptable for:

1. Stub in wall feeds to above ceiling speakers and loudspeaker arrays. Secure such cabling above the ceiling using cable support hooks (e.g., J-hooks).

2. Short links (e.g., between equipment racks or cabinets).

3. Within or under concrete slab per specification Section 26 05 33.

Size raceway as shown on drawings or base on a maximum calculated fill (total cable area vs. raceway area) not to exceed 40%, whichever is larger. Coordinate with AV Systems Installer to confirm cabling requirements.

Raceway sizes and quantities shown on drawings are minimums. Separate runs specified in bid documents may not be combined for any purpose unless noted otherwise.

Minimum raceway size allowed for AV cables is 3/4 inch.

For raceway runs of 50 to 100 feet, reduce the maximum fill of cables in that raceway by 35% or provide the next larger raceway size.

Provide PVC or other non-conductive fittings to isolate the raceway from the AV equipment racks.

Position raceway at equipment racks or cabinets per Avixa cable separation guidelines-F502.

Separation

Raceways with different wiring classes must maintain minimum separations to minimize interferences from electrical noise.

Provide separate raceway for different wiring classes as follows:

Group Description

A Microphone level AV

B Line level AV, Communication (Intercom)

C Speaker level AV, including low- and high-impedance types (e.g., 70V)

D Control, Data

E Video (Baseband)

F Video (Digital)

G Fiber Optic

H RF Wireless Audio Equipment Antenna

I Assisted Listening System Antenna/Loop Wiring

The following tables define the required minimum separations between the group divisions and other services.

|  |  |  |  |
| --- | --- | --- | --- |
| Group | Description | Level | Bandwidth |
| A | Microphone level AV circuits | Below -30 dBµ | 20 Hz to 20 kHz |
| B | Line level AV circuits, Communication Circuits (Intercom) | -30 dBµ to +24 dBµ | 20 Hz to 20 kHz |
| C | Speaker level AV circuits, including low- and high-impedance types (70V) | Greater than +24 dBµ | 20 Hz to 20 kHz |
| D | Control Circuits Data Circuits | 0-28 volt into <50k ohm  2-volt peak-peak into 100 ohms | 0 Hz to 100 MHz |
| E | Video (Baseband) | 1-volt peak-peak into 75 ohms | 0 Hz to 10 MHz |
| F | Video (Digital HDMI 2.1) | UHD 4K/100-120 fps-12 Bit Color | 48.11Gbps |
| G | Fiber Optic Circuits | N/A | N/A |
| H | RF Audio Wireless Equipment Antenna | <50-milliwatt power output | 617-652 MHz &  663-698 MHz |
| I | Assisted Listening Systems (ALS) | 8000 uV/M at 30 meters | 72-76 MHZ |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Wire Class | A | B | C | D | E | F |
| A | Adjacent | 6 inches | 12 inches | 12 inches | 12 inches | Adjacent |
| B | -- | Adjacent | 12 inches | 6 inches | 6 inches | Adjacent |
| C | -- | -- | Adjacent | 6 inches | 6 inches | Adjacent |
| D | -- | -- | -- | Adjacent | Adjacent | Adjacent |
| E | -- | -- | -- | Adjacent | Adjacent | Adjacent |
| F | -- | -- | -- | -- | 12 inches | Adjacent |
| G | Adjacent | Adjacent | Adjacent | Adjacent | Adjacent | Adjacent |
| H | -- | -- | -- | -- | 12 inches | Adjacent |
| I | -- | -- | -- | -- | 12 inches | Adjacent |
| Power Conduit <60A | 24 inches | 24 inches | 24 inches | 24 inches | 24 inches | Adjacent |
| Power Conduit 60 - 120A | 48 inches | 48 inches | 48 inches | 48 inches | 48 inches | Adjacent |
| Power Conduit >120A | 64 inches | 64 inches | 64 inches | 64 inches | 64 inches | Adjacent |

|  |  |  |  |
| --- | --- | --- | --- |
| Wire Class | G | H | I |
| A | Adjacent | 12 inches | 12 inches |
| B | Adjacent | 12 inches | 12 inches |
| C | Adjacent | 24 inches | 24 inches |
| D | Adjacent | 12 inches | 12 inches |
| E | Adjacent | 12 inches | 12 inches |
| F | Adjacent | 12 inches | 12 inches |
| G | Adjacent | Adjacent | Adjacent |
| H | Adjacent | 12 inches | 12 inches |
| I | Adjacent | 12 inches | 12 inches |
| Power Conduit <60A | Adjacent | 24 inches | 24 inches |
| Power Conduit 60 - 120A | Adjacent | 48 inches | 48 inches |
| Power Conduit >120A | Adjacent | 64 inches | 64 inches |

Ninety-degree crossings in close proximity are acceptable between groups A through I.

AV Box Installation

General

Provide Raceway and Boxes as shown on the Electrical and/or Audio-Video drawings.

Coordinate with Division 26 and Division 27 Structured Cabling as applicable to ensure an integrated installation.

Flat Screen Display Boxes

Coordinate box location with the AV Systems Installer. Consider electrical power, conduits for AV and network cabling and access to box. The AV Systems Installer shall furnish the flat screen mounting brackets for such coordination to ensure that the box cover and cables are not blocked by the brackets and are concealed behind the display.

Add direction as to conditions where boxes might be provided by the AV System Installer for installation by Div. 26 if not identified on drawings. Placing such information on the drawings is recommended.

END OF SECTION