

I. ROOM ACOUSTICS

- A. Room ambient sound level should be NC 25, 35 dBA @ 500 Hz. (See paragraph VI)
- B. All nearby mechanical equipment should be adequately isolated, both mechanically and acoustically.
- C. Provisions for adequate acoustic energy absorption highly recommended. An acoustic decay rate of 16 dB in 60 ms. ($\diamond RT60=0.27$) is considered adequate.

II. WIRE & CABLE (Substitute Plenum equivalent when necessary)

- A. Microphone: Belden 8451 or equivalent, 22 gauge twisted pair w/drain, 100% foil shield.
- B. Loudspeaker: Belden 8471 or equivalent, 16 gauge twisted pair.
- C. Control: Belden 8442 or equivalent, 22 gauge twisted pair.

III. WIRING

- A. All wiring from ceiling equipment shall be un-spliced, point to point, clearly and permanently identified at both ends.
- B. Wiring in the following categories shall not be run in the same conduit, bundle or run in close proximity to each other (12" minimum separation for signal circuits, 24" minimum to power circuits):

Type 1: 0 - 100 milliVolts, Microphone or other sensitive wiring.

Type 2: 100 milliVolts - 10 Volts, Line level wiring.

Type 3: 10 - 70 Volts, Loudspeaker and/or control wiring.

Type 4: Telephone, Video and Digital circuits.

IV. TELEPHONE (Analog phone Line Suggestions for Consistent High Quality Audio Conferencing)

A voice quality (high quality) analog line/ analog port should be available for the full duplex audio conference system. (i.e. not a fax quality analog line or a digital line)

Typical methods of obtaining this are:

- A. Dedicated Analog Line (i.e. a line that bypasses the PBX system is preferred)
- B. If there is a requirement that the phone line must pass through the PBX system then:
 - 1. OPX (Off Premise Extension) Card* or OPX emulation implemented for analog port on the PBX system. (*Contact PBX manufacturer for specific model numbers)
 - 2. Dedicated High Quality Analog Port on the PBX assigned to this line

V. POWER & GROUNDING

- A. Conduits terminating at the equipment rack should be terminated through insulating bushings.
- B. Equipment racks should be grounded back to the technical reference ground through the equipment mounted in the rack.
- C. Clean, surge protected power source, or a dedicated circuit to which surge protection equipment can be added.

VI. BACKGROUND NOISE & AMBIENT SOUND LEVEL

Average noise levels for a space may be approximated using A-weighting scale, or dBA. Generally, an interior space will have varying noise levels throughout the range of human hearing which are generally measures with reference to Noise Criteria (NC) curves..

Each curve has a different NC rating number and is represents a different noise level as perceived by the human ear. Through experience and testing, acousticians have determined acceptable NC levels for various uses of interior spaces

VII. RECOMMENDED NOISE CRITERIA FOR ROOMS¹

Noise criteria (NC) curves can be used as a method for specifying continuous background noise levels to achieve sound isolation (and for evaluating existing noise situations as well). Table 1 below presents recommended NC ranges for various indoor functional activity areas.

Table 1

Type of Space (and Listening Requirements)	Preferred Range of Noise Criteria	Equivalent dBA Level
Concert halls, Opera houses recording studios, etc. (for excellent listening conditions)	NC-15 to NC-20	25 to 30
Bedrooms, sleeping areas, hospitals, residences, hotels, etc. (for sleeping, relaxing)	NC-20 to NC-30	30 to 40
Auditoriums, theaters, radio/TV studios, music practice rooms, large conference rooms, executive offices, churches, courtrooms, etc. (for very good listening conditions)	NC-20 to NC-30	30 to 40
Private or semi private offices, small conference rooms, classrooms, reading rooms, libraries, etc. (for good listening conditions)	NC-30 to NC-35	40 to 45
Large offices, reception areas, retail shops and stores, cafeterias, restaurants, gymnasiums, etc. (for fair listening conditions)	NC-35 to NC-40	45 to 50
Lobbies, corridors, Laboratory work spaces, drafting and engineering rooms, general secretarial areas, maintenance shops, etc. (for moderately fair listening conditions)	NC-40 to NC-45	50 to 55
Kitchens, laundries, school and industrial shops, garages, machinery spaces, computer equipment rooms, etc.	NC-45 to NC-55	55 to 65

Refer to SCT document SPEC-3 for further information.

¹ From Egan: *Concepts in Architectural Acoustics*