

**SECTION 27 51 23**  
**INTERCOMMUNICATIONS AND PROGRAM SYSTEMS**

**SPEC WRITER NOTES:**

1. Use this section only for NCA projects. Delete text between // \_\_\_\_\_ // not applicable to project. Edit remaining text to suit project.
2. Contact Department of Veterans Affairs' (VA) AHJ, Spectrum Management and COMSEC Service (SMCS), Special Communications Team (SMCS 07A2), Telephone (202-461-5301/5311), for technical assistance.
3. When using this section, always include Section 27 05 00, COMMON WORK RESULTS FOR COMMUNICATIONS in project specifications.

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

**SPEC WRITER NOTE:** Insert cemetery name and contract identification number.

1. New state-of-the-art fully functioning intercommunication and program systems installed in VA's National Cemetery (NCA)  
// \_\_\_\_\_ // to regulate access to restricted buildings, // building areas, // and // fenced areas //. // Contract // Project // Number:  
// \_\_\_\_\_ //.

- B. See Section 27 05 00, COMMON WORK RESULTS FOR COMMUNICATIONS for requirements governing work of this section.

**1.2 RELATED REQUIREMENTS**

**SPEC WRITER NOTE:** Update and retain references only when specified elsewhere in this section.

- A. General electrical requirements and items common to more than one Division 27 section: Section 27 05 00, COMMON WORK RESULTS FOR COMMUNICATIONS.
- B. Grounding: Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATION SYSTEMS.
- C. Raceways, Fittings, and Boxes: Section 27 05 33, CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS.

**1.3 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. Electronics Industries Association/Electronic Components Association (EIA/ECA):
  - 1. 310-E (2005) - Cabinets, Racks, Panels, and Associated Equipment.
- C. National Electrical Contractors Association (NECA):
  - 1. 1-15 - Good Workmanship in Electrical Construction.
- D. National Fire Protection Association (NFPA):
  - 1. 70-17 - National Electrical Code.
- E. UL LLC (UL):
  - 1. 813-96 (Rev. 1999): - Commercial Audio Equipment.
- F. United States Air Force (USAF):
  - 1. TO 33K-1-100-2 - TMDE Calibration Interval Technical Order and Work Unit Code Reference Guide.

**1.4 SUBMITTALS**

- A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Warranty Period Services: List entities to certify system and perform warranty period services. Listing includes company brochure, and name - title - normal and emergency telephone numbers of individuals providing services.
- C. Field Quality Assurance:
  - 1. Test Plan: Submit to Office of Telecommunications (333), before pretesting for evaluation and approval.
  - 2. Submit test reports.
- D. Training Plan: Submit detailed lesson plan for Demonstration and Training specified in Part 3. Plan will be evaluated and approved by AHJ SMCS 07A2.
- E. Test Equipment List: Submit manufacturer and model number of the following:
  - 1. Sound Pressure Level (SPL) meter.
  - 2. Sound Pressure Level Calibrator.
  - 3. Random Noise Generator.
  - 4. True RMS Voltmeter.
  - 5. Audio Amplifier with external speaker.
  - 6. Unless otherwise stated, test equipment is not considered part of system. Provide test equipment of accuracy better than parameters to be tested. Furnished test equipment to have calibration traceable to

National Institute of Standards Technology. Calibration intervals according to USAF TO 33K-1-100-2.

F. Certificates:

1. Proposed installation supervisor and proposed performer of warranty period services are authorized intercommunications equipment manufacturer's representatives. Include name and address on certificate.
2. Proposed wiring installation and connection diagrams meet this specification, UL requirements, and intercommunications equipment manufacturer's instructions for proper system performance. VA will not approve any submittal without this certification.
3. Two weeks before final inspection, submit four copies of certificate to Contracting Officer's Representative (COR) by authorized intercommunication equipment manufacturer's representative certifying system has been properly installed, adjusted, and pre-tested.

**1.5 WARRANTY**

SPEC WRITER NOTE: Always retain construction warranty. FAR includes Contractor's one year labor and material warranty.

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

**PART 2 - PRODUCTS**

**2.1 SYSTEM DESCRIPTION**

- A. Intercommunications system, half-duplex, star topology, battery backup power, and continuous system wiring monitoring.

**2.2 SYSTEM PERFORMANCE**

- A. Sound Reproduction: Intercommunication system reproduces at all receiving stations:
1. 30 dB dynamic range of 40 dB minimum input signal referenced to sound pressure level (SPL) over frequency range of 300 to 3300 Hz. Unless otherwise specified, SPL to be 0.00002 N/sq. m (.0000004177 lbs./sq. ft.).
  2. Root-mean square (rms) extraneous noise (e.g. hum) level, minimum 30 dB below nominal signal level.

3. Distortion, including envelope delay, intermodulation, cross talk, and other nonlinear source, maximum 5 percent.

SPEC WRITER NOTES: Make material requirements agree with applicable requirements specified in referenced Applicable Publications. Specify only what applies to this project.

### 2.3 PRODUCTS - GENERAL

- A. Equipment: UL 813, new and manufacturer's current model standard products.
- B. For each item of equipment, manufacturer maintains:
  1. Factory production line.
  2. Replacement parts stock.
  3. Engineering drawings, specifications, operating manuals and maintenance manuals.
- C. Electronics in equipment rack and in stations to be equipment manufacturer's products, designed and factory tested to operate as an integrated system.
- D. Service Conditions: Capable of operating continuously without mechanical or electrical damage or degradation of service as follows:

Function	Characteristics
Input Voltage	120 V RMS plus or minus 10 percent
Frequency	60 Hz
Operation Temperature	Zero to 40 degrees C (32 to 104 degrees F)
Humidity	0 to 80 percent Relative, non-condensing

### 2.4 EQUIPMENT

- A. General: Component equipment specifications are minimum requirements, unless otherwise stated, and are not be construed as limiting overall quality, quantity or performance characteristic of system components.
- B. Basic Requirements:
  1. Signaling and Communication Circuits: Solid state.
  2. Utilizes microprocessor components for signaling and programming circuits and functions. Program memory to be non-volatile or protected from erasure from power outages for minimum five minutes.
  3. Equipment rated for continuous duty.

4. Continuous polling of each station sequentially.
  5. Signal and Voice Circuits: Low Voltage, maximum 24 Volts.
- C. Power Amplifier:
1. Power Output: Minimum required to drive system components to rated output levels during all-call, plus unused stations on master station.
    - a. Total Harmonic Distortion: Less than 5 percent at rated power output.
    - b. Minimum Signal-To-Noise Ratio: 45 dB at rated output.
    - c. Frequency Response: Plus or minus 3 dB from 70 to 10,000 Hz.
  2. Automatic Volume Limiters: Control variations in sound levels that do not clip or distort sound.
  3. Protective Circuit: Prevent damage from shorted or open output.
- D. Intercommunication Amplifier:
1. Power Output: Minimum required to drive station to rated output level.
    - a. Total Harmonic Distortion: Less than 5 percent at rated power output.
    - b. Minimum Signal-To-Noise Ratio: 45 dB at rated output.
    - c. Frequency Response: Plus or minus 3 dB from 70 to 10,000 Hz.
  2. Automatic Volume Limiters: Control variations in sound levels that do not clip or distort sound.
  3. Protective Circuit: Prevent damage from shorted or open output.
- E. Master Station Configuration: Includes handset, microphone/speaker, volume control, push-to-talk button, LED illuminated incoming call/privacy indicator and LED illuminated selectors.
- F. Enclosure: Wall or desk mounted, equipped with 2 meter (6 foot) cord and plug for connecting station to wall outlets.
- G. Staff Station Configuration:

SPEC WRITER NOTE: Staff stations are  
without handset, unless otherwise  
indicated on drawings.

1. Desk-mounted staff stations includes microphone/speaker, volume control, incoming call/privacy indicator and selector switch for each master station, in an enclosure suitable for wall or desk mounting. Provide cradle and handset where indicated on drawings. Equip unit with 2 meter (6 foot) cord and plug for connecting station to wall outlets.

## H. Master Station Functional Requirements:

1. Intercom System: Selective-signaling, selective-talking type.
2. Initiation of call automatically places calling station and called station in private mode, cannot be interrupted by other callers. Subsequent calls for stations in use to receive busy signal.
3. Capable of selectively calling and communicating with system stations.
4. Master station originated calls, answered without operating any switches or controls (hands-free) at called station.
5. Staff to master calls sound tone/chime and illuminate incoming call/privacy LED at master, when answered, permits voice communications with call originator. Incoming call/privacy LED remains illuminated until call is answered or cancelled.
6. Capable of all-call paging to all staff stations simultaneously.
7. Handsets and microphone/speaker remain silent while energized and not in use.
8. Lifting handset automatically mutes speaker/microphone.

## I. Instruments:

1. Housing and Handsets: High-impact resistant material, finish impervious to commonly used cleaning agents.
2. LED type dial or switch illuminating lamps, accessible for replacement without use of special tools or dismantling instrument housing.
3. Audible devices used for signaling to be adjustable over a range suitable for environment in which they are installed.

J. Backup Power: Sealed nickel-cadmium battery, supply power to intercommunications system through automatic electronic switch when normal power fails, minimum 15 minutes at rated output in all-call mode. Includes two-rate automatic battery charger with automatic trickle tare and recharge rate.

K. Central Equipment Cabinet: For housing switching, wiring terminals, amplifiers, polling circuits and indicators, power supplies, backup power, and auxiliary equipment.

1. Comply with EIA/ECA 310-E.
2. Surface flush mounted cabinet, 482.2 mm (19 inch) standard modular rack, ventilated, with locking door.
3. Primer: Suitable for field painting.

**PART 3 - EXECUTION****3.1 INSTALLATION - GENERAL**

- A. Install equipment according to NFPA 70.
  - 1. Comply with NECA 1.
- B. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.
- C. Identification: Color-code conductors, apply wire and cable marking to designate wires and cables to coordinate with system wiring diagrams.

**3.2 GROUNDING**

- A. Ground installed equipment according to Section 27 05 26, GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS.

**3.3 SYSTEM WIRING**

- A. Install cabling in raceway, // and cable tray, // except within instruments, cabinets, counters and desks. Conceal raceway and cables, except in unfinished spaces.
- B. Install raceway and boxes as specified in Section 27 05 33, CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS, except where raceway has not been provided for designated drops to rooms.
- C. Bundle, lace, and train cables within enclosures to terminal points without exceeding manufacturer's limitation on bending radii. Provide and use lacing bars and distribution spools.
- D. Install grommets/bushings to protect cabling penetrating through counter or wall openings.
- E. Terminate conductors. Cable with unterminated elements is not acceptable. Make terminations only at outlets and terminal strips. Cables may not be spliced.
- F. Cold-weather Installation: Bring cable to room temperature before dereeling. Heat lamps are not acceptable.

**3.4 SEPARATION OF WIRES AND CABLES**

- A. Separate speaker-microphone, line-level, speaker level, and power wiring runs.

- B. Install in separate raceways or, when in the same enclosure, separate conductors at least 300 mm (12 inches) for speaker-microphones, adjacent parallel power, and telephone wiring.
- C. Separate other intercommunications equipment conductors according to manufacturer's instructions.

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