SECTION 275116 – PUBLIC ADDRESS SYSTEMS

1. GENERAL
   * + 1. SUMMARY
          1. Related Documents:

Drawings and general provisions of the Subcontract apply to this Section.

Review these documents for coordination with additional requirements and information that apply to work under this Section.

* + - * 1. Section Includes:

Communication system (telephone/paging system) and accessories.

* + - * 1. Related Sections:

Division 01 Section "General Requirements."

Division 01 Section "Special Procedures."

Division 26 Section "Common Work Results for Electrical".

Division 26 Section “Inspections and Testing for Electrical Work”.

Division 26 Section "600 Volt Conductors and Cable."

Division 26 Section “Low Voltage Electrical Power Conductors and Cables (24 Volt AC/DC or Less)”

Division 26 Section "Electrical Conduit".

* + - 1. REFERENCES
         1. General:

The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.

Unless otherwise noted, the edition of the referenced code or standard that is current at the time of the “date of record” for the Work shall be considered the effective code or standard for the duration of the project.

Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.

* + - * 1. ANSI/IEEE 241-1983 Recommended Practice for Electric Power Systems in Commercial Buildings (IEEE Gray Book)
        2. ANSI/NFPA 70 - National Electrical Code.
        3. LBNL Construction Details and Design Guidelines; Vol. 3 Construction Details; Part VI Electrical Details
        4. LBNL Electrical Authority having Jurisdiction: Standard Procedure for Safe Electrical Installations (IAHJ Program)
        5. LBNL Electrical Safety Manual
        6. LBNL Facilities Department Lateral Force Design Criteria
        7. LBNL Pub-3000 Chapter 8 - Electrical Safety Program
        8. LBNL Pub-3000 Chapter 18 - Lockout/Tagout Program
        9. NEMA – National Electrical Manufacturers Association:

ANSI/NEMA 250 Enclosures for Electrical Equipment

* + - 1. SYSTEM DESCRIPTION
         1. This section specifies the provision of public address system equipment which shall incorporate the following features:

The Subcontractor shall provide the communication system (telephone/paging system) and accessories required for a complete and operable plant communication system, all in accordance with the requirements of the subcontract documents.

The system shall use digital switching and transmission with capability to support both digital and (electronic) telephones.

Audio shall be reasonably intelligible at all employee work stations, passageways and rest rooms.

Sound levels shall not differ by more than 6 dB throughout a given work area. For ceiling speakers, the following guidelines may be used:

The distance between speakers is not to exceed 2.5(h-4).

The distance from a wall is not to exceed h (where h = the mounting height of the ceiling speaker).

AC power shall be provided from the building's standby power system. In addition, a standby power system (SPB) or Uninterruptable Power Supply (UPS) shall be located at each amplifier location capable of maintaining amplifier operation for no less than 120 minutes at full power. This includes locations where no emergency power is located for the amplifier.

At least one microphone shall be provided in each control room or departmental office or building manager's office as well as at the main fire alarm control panel or other location as specified by the Fire Department, and shall be wired per item 1 under the microphone section below.

When more than one floor is involved, each floor greater than 1400 sq feet (130 m²) shall have its individual amplifier/speaker system.

Substitutions of other materials or components from what is specified herein will not be allowed without prior approval by LBNL / Facilities Engineering.

Provision shall be made for the LBNL Radio Hill PA system. The radio Hill PA system shall enter the amplifier at a line level separate designated input and the control knob labeled “HPA”. The Radio Hill PA box will be constructed by LBNL.

* + - 1. SUBMITTALS
         1. Submit under provisions of Division 01 Section "General Requirements" Paragraph 1.8.F, Submittals, and Division 01 Section "Special Procedures" Paragraph 1.7, Drawings and Specifications, Division 26 Section "Common Work Results for Electrical - Submittals" and as required by other sections of the Specifications."
         2. Shop Drawings: The Subcontractor shall submit for approval Shop Drawings prepared in accordance with Division 01 Section "General Requirements", Paragraph 1.8.F and as required by other sections of the Specifications.
         3. Submit the following:

Block diagram showing system relationships of major components and quantities and interconnecting cable requirements.

Plans showing equipment locations, raceway, and conduc­tor requirements.

Control console and panel arrangements, equipment outlet devices, and special mounting details.

Wiring diagrams shoving terminal identification for field-installed wiring. These diagrams shall show the actual wiring paths used with color codes. Locations of splice and terminal boxes shall be shown.

Catalog literature showing equipment ratings, finish, controls, and indicators.

* + - 1. QUALITY ASSURANCE
         1. Products shall be tested, approved and labeled/listed by Underwriters Laboratories, Inc., or by a nationally recognized testing laboratory (NRTL) as listed in Division 26 Specification "Common Work Results for Electrical."
         2. Electrical equipment and materials shall be new and within one year of manufacture, complying with the latest codes and standards. No used, re-built, refurbished and/or re-manufactured electrical equipment and materials shall be furnished on this project.
      2. DELIVERY, STORAGE, AND HANDLING
         1. Deliver materials to site in unopened cartons or bundles as appropriate, clearly identified with manufacturer's name, Underwriter's or other approved label, grade or identifying number.
         2. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
      3. Warranty
         1. Warranty period of one (1) year minimum shall start at the date the equipment is energized after acceptance by the University.

1. PRODUCTS
   * + 1. AMPLIFIERS
          1. All Amplifiers should be of the TOA 900 series with appropriate input modules or LBNL approved equivalent to provide a 70 Volt sound distribution system.
          2. There should be a minimum of one (1) amplifier per occupied floor.
          3. Input Modules are the L-41 series for Hill Public Address, L-11 series for the Building Page, and M-11 for the Microphone input module.
          4. In most new installations the amplifier should be a wall-mounted TOA 900 Series with a back box.
          5. Amplifier output power rating shall be greater than three times their total load.
       2. SPEAKERS
          1. Each speaker shall have its own 70 volt transformer.
          2. Each speaker shall have its own accessible exterior volume control mounted on the enclosure.
          3. For ceiling speakers, provide the following or LBNL approved equivalent:

Soundolier speaker assembly (prewired with volume control) SD72WV

Soundolier enclosure 95-8

Soundolier bridge 81-8R

* + - * 1. For wall mounted speakers, provide the following or LBNL approved equivalent:

J. W. Davis speaker assembly (prewired with volume control and lower volume limit resistor) LBL-01

J. W. Davis speaker assembly (prewired with volume control and lower volume limit resistor LBL-02

* + - * 1. For corridor mounted speakers, provide the following or LBNL approved equivalent:

Soundolier speaker assembly FC104-T72

Soundolier enclosure 410-4 Omnidirectional

Soundolier enclosure 510-4 Bidirectional

* + - * 1. Install a 100 ohm, 2 watt potentiometer (CTS 550R101A) in series with each corridor speaker voice coil, connecting the wiper of the potentiometer to its counterclockwise terminal.
      1. LOUDSPEAKERS IN HAZARDOUS AREAS
         1. General:

Horn type speakers shall be provided with universal mounting brackets to permit mounting angle adjustment in both the horizontal and vertical planes. Loudspeaker nominal power ratings shall be based on continuous pink noise, band limited 500 to 3000 hertz.

* + - * 1. Small Horns:

Small horns shall be 10-inch (250 mm) nominal diameter exponential reflex horns. Low frequency cutoff shall be 250 hertz nominal and dispersion shall be 105 degrees. Nominal power rating shall be 30 watts. Sound pressure shall be not less than 126 dB (ref. 0.0002 dynes/sq cm) measured at 4 feet on axis when driven at specified nominal power rating. Horn shall be aluminum construc­tion with epoxy finish. Small horns shall be University IB-A8, GTC 13320, Executrone Model 4401907, or equal. Drivers shall be GTC series 13310-101 or LBNL approved equivalent.

* + - * 1. Large Horns:

Large horns shall be 20-inch nominal diameter exponential reflex horns with 3.5-foot air column. Low frequency cutoff shall be 150 hertz nominal and dispersion shall be 85 degrees. Nominal power rating shall be 30 watts. Sound pressure shall be not less than 126 dB when driven at specified nominal power rating. Horn shall be aluminum construction with epoxy finish. Large horns shall be University PH/7110XC, GTC 13303, or equal. Drivers shall be GTC series 13310-102, or LBNL approved equivalent.

* + - 1. MICROPHONES
         1. For microphone installations, provide the following or LBNL approved equivalent:

Shure microphone 561 or a 514B Shure handheld microphone  
This should be located where the amplifier is located on every floor.

Atlas slim gooseneck GNS-13

Shure base S37A

C & K switch 8121

* + - * 1. Items 2,3,4 will make up the Microphone to be used as described in Section 1.3, line 6, for the desk microphones where designated. The switch shall be mounted on the base and wired in series with the black microphone lead to pin 2 of the amplifier connector. The remaining white lead and shield shall be wired to the amplifier connector pins 3 and 1, respectively.
      1. Hill WIDE PUBLIC ADDRESS (HPA) (**required and no substitutions**)
         1. Provide a separate designated line level input in each of the building Public Address (PA) amplifier(s) for feed from the Radio Hill PA equipment (Radio HPA equipment constructed by LBNL). Location of the Radio Hill PA equipment shall be at an optimum location for radio reception (designated by LBNL Radio Shop) with a line level audio feed on 18 gauge twisted pair shielded plenum rated wire to each building amplifier, and the input control knob labeled “HPA”.
         2. AC power shall be provided from the building's standby power system.
      2. BUILDING PAGE (Optionally available or changed by LBNL Facility Engineering)

1. This is an input that is supplied by the LBNL Network / Phone Data group and provides Phone paging to the building. Amplifier for a local paging system, which is attached through the phone for phone building Page. This input is attached into each floor amplifier through a TOA L-11 Module.
2. EXECUTION
   * + 1. INSTALLATION
          1. Devices shall be seismically secured. Shelf-mounted amplifiers shall have earthquake grips securing the units to the shelf. Ceiling speaker assemblies (top hats, bridges) shall be secured with approved safety wiring to the structure above.
          2. Amplifiers shall be mounted on a 15-inch deep by 23-inch wide (380 mm deep by 584 mm deep) shelf with a 1-inch (25 mm) security lip around its perimeter and shall be located in the communications closet, 48 inches above the floor.
          3. Where a wall mount amplifier is used, follow a standard TOA installation procedure, with accessibility to maintain the equipment.
       2. WIRING
          1. Plenum rated 18-4 gauge wire with orange colored jacket. Part number 0023440-S made by Windy City Wire, 1-800-379-1191. Plenum wire or LBNL approved equivalent.
          2. Wiring shall be terminated on a terminal strip before being cabled to the amplifier with no splices between outlets and junction boxes.
          3. Outlets and junction boxes shall be readily accessible.
          4. Speakers/transformers and wires shall be connected using the 70 volt system in a distributed fashion.
          5. Documentation of wiring routes and connections shall be provided to the Architect-Engineer.
       3. Field quality control
          1. Tests shall be made in the presence of an LBNL Inspector or the Project Manager’s designated representative. The application or interruption of power shall be programmed and directed by the Project Manager and in accordance with the approved EVAP, inclusive of the Equipment Energization Plan and necessary permits, work tasks and safety compliance steps.
          2. The Subcontractor shall supply the required test equipment.
          3. Prior to final acceptance, the loudspeaker distribution system shall be tested for proper total impedance load (4,000/N) ±10 percent, absence of short to ground, and absence of rattles, buzzing, and/or other foreign noises or distortion.
          4. The Subcontractor shall submit to the Project Manager five (5) copies of test results, certified in writing, witnessed, signed and dated, immediately upon completion of work for review and acceptance by the University. An unsatisfactory condition revealed by these test results, or unsatisfactory methods of tests and/or testing apparatus and instruments, shall be corrected by the Subcontractor to the satisfaction of the Project Manager.
          5. The Project Manager reserves the right to require that the Subcontractor perform and repeat tests that are deemed necessary to complete or check the tests or the certified records of the Subcontractor at any time during the course of the work. The Subcontractor shall correct unsatisfactory portion of his work that is revealed by the tests or that may be due to progressive deterioration during this period, unless the item in question was a direct specification.

END OF SECTION 275116