SECTION  – sounds masking systems

General

* 1. summary
     1. This Section includes the supply and installation of the following:
        1. Sound masking systems.
  2. REFERENCE Standards
     1. ASTM E1374-06, Standard Guide for Open Office Acoustics and Applicable ASTM Standards
     2. ASTM E1573-09, Standard Test Method for Evaluating Masking Sound in Open Office Using A-Weighted and One-Third Octave Band Sound Pressure Levels
     3. ASTM E1130-08, Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index
  3. PERFORMANCE REQUIREMENTS
     1. Sound Masking Signal Generation
        1. The masking sound generation shall be random and exhibit no noticeable pattern. Pseudo-random generation cycles shall exceed 24 hours.
        2. An independent generator shall be provided for each sound masking zone (as defined in Section 1.4.B.1).
     2. Sound Masking System Control:
        1. The system shall be arranged into groups of speakers (zones) based on common installation and localized acoustical conditions.
           1. Zones shall conform, at a minimum, to those shown on the system design drawing included in Appendix A of this specification.
           2. In closed spaces, zones shall be designed such that they only cover spaces of similar size and use. For example, a single zone shall not extend over both private offices and meeting rooms. iv. Each zone shall be individually adjustable for fine tuning of the system.
     3. Sound masking controls in each zone shall include:
        1. A third-octave band equalizer with a minimum of 21 bands ranging from at least 100Hz to 10kHz.
        2. A volume control adjustable in 0.5dB(A) increments over a range of 35dB(A) to 85dB(A) at a distance of 1m (3.3ft) from the speaker on axis.
     4. Each zone shall be adjustable from:
        1. A masking system-branded or third-party hardware control panel on each floor.
        2. A software control application.
     5. Measured Performance Requirements:
        1. Measure and document sound masking performance as per Section 3.9.
        2. With the exception of those areas identified in 1.4.C.1.a and other exemptions requested by the client, all areas shall conform to the masking sound levels defined in Section 1.4.C.3 and the associated sound spectrum defined in Section 1.4.C.5.
           1. The masking sound level shall be:

Open offices – 47 dBA

Private offices – 42 dBA

Meeting rooms – 44 dBA

* + - 1. The sound masking system shall provide spatial uniformity of +-1/2dBA for the overall sound masking sound level in each type of space.
      2. The masking sound spectrum for 45 dBA shall be as defined in the table below.
         1. The spectrum shall be maintained for each target volume by adding/ subtracting 1dB in each third octave for each dBA increase/decrease from the 45dBA curve below.

|  |  |
| --- | --- |
| **Band Center Frequency**  **(Hz)** | **National Research Council Optimum Spectrum Band Levels** |
| **Overall dBA** | **45.0** |
| 63 | - |
| 80 | - |
| 100 | 46.9 |
| 125 | 45.9 |
| 160 | 44.7 |
| 200 | 43.9 |
| 250 | 42.7 |
| 315 | 41.4 |
| 400 | 40.4 |
| 500 | 38.9 |
| 630 | 37.4 |
| 800 | 35.4 |
| 1,000 | 33.7 |
| 1,250 | 31.4 |
| 1,600 | 29.4 |
| 2,000 | 27.4 |
| 2,500 | 24.9 |
| 3,150 | 22.4 |
| 4,000 | 19.4 |
| 5,000 | 16.4 |
| 6,300 | - |
| 8,000 | - |
| 10,000 | - |

* + - 1. Measured sound masking levels in each third-octave band shall vary no more than +/1dB from the target level.
      2. Measured deviations of the masking sound exceeding the tolerances identified in Section 1.4.C.4 and 1.4.C.6 shall be corrected by the vendor at no additional charge, including any requirement to add further zones.
    1. Diagnostic Performance:
       1. The system shall provide monitoring functions to detect electronic components that are not functioning.
       2. The system shall provide email notification of monitoring alerts to user-selected addresses.
    2. Reporting Performance:
       1. The hardware control panel(s) and software control application shall be capable of reading and displaying the current settings for all speaker zones.
       2. The control application shall be capable of generating detailed soft and hardcopy reports of all system settings.
    3. Security Performance:
       1. Physical Security Measures:
          1. Below-ceiling electronic components shall be contained in a locked metal enclosure or cabinet.
          2. Cabling connections to below ceiling electronic components shall be made within the locked metal enclosure.
       2. Electronic Security Measures:
          1. Access to the control functions shall be password protected.
          2. The system shall allow for all settings to be backed up on an electronic storage medium.
          3. The system shall store settings in non-volatile memory.
       3. The system shall permit the sound masking to be automatically muted during fire alarms.
  1. SUBMITTALS
     1. Proposals with incomplete submissions per this section shall be rejected.
     2. Product Data – Manufacturer’s specifications and installation instructions.
     3. System Design – Schematics of the system showing quantity and location of components and related cabling and accessories.
     4. Warranty Documents – Warranty documents covering the system components and installation per Section 1.8.
     5. Regulatory Testing and Certifications – Provide proof of compliance with certifications and standards identified in Section 1.9.
     6. Specification Compliance Statement:
        1. A signed compliance statement from an executive officer of the manufacturer stating that the system as proposed to the customer will meet the design and performance requirements outlined in Section 1.4 herein.
        2. The statement shall indicate compliance/non-compliance for each individual section and subsection of this specification.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Minimum of ten (10) years manufacturing sound masking systems.
     2. System Design: Performed by an approved manufacturer representative.
     3. Installer Qualifications: Approved by manufacturer representative and trained with the specified products or have demonstrated experience with the installation of similar products to those specified.
     4. System Adjustment: Done by an approved manufacturer representative or trained contractor.
     5. Single Source Responsibility: Source electronic masking components, loudspeakers, wall controls and cables from a single manufacturer.
  3. DELIVERY, STORAGE AND HANDLING
     1. Protect from moisture during shipping, storage, and handling.
     2. Deliver in manufacturer’s original unopened and undamaged packages with manufacturer’s labels legible and intact.
     3. Inspect manufacturer’s packages upon receipt.
     4. Handle packages carefully.
  4. WARRANTY
     1. Provide a written warranty from the manufacturer that products installed shall be free from defects in parts or assembly for a five (5) year period from date of first use.
     2. Provide a written warranty from the vendor that installation will be guaranteed for a one (1) year period from date of first use.
  5. REGULATORY TESTING AND CERTIFICATIONS
     1. The system components shall conform to:
        1. Safety and Electrical:
           1. IEC 60065: Standard for Audio, Video and Similar Electronic Apparatus - Safety Requirements.
           2. Products shall be labelled accordingly.
        2. Electromagnetic Interference (EMI):
           1. ICES-003 (Industry Canada): Interference-Causing Equipment Standard
        3. Low Voltage Power Supplies:
           1. UL1310, Standard for Class 2 Power Units.
           2. Products shall be labelled accordingly.

1. Products
   1. MANUFACTURERS
      1. Acceptable Manufacturers and Systems:
         1. K.R. Moeller Associates Ltd. (LogiSon Acoustic Network):

3-1050 Pachino Court, Burlington, Ontario L7L 6B9 Canada.  
Tel: 1-866-564-4766); Fax: (905) 238-9079  
Email: [ewalcott@enviraco.com](mailto:ewalcott@enviraco.com)  
Web: [www.logison.com](http://www.logison.com)

* + - 1. Softdb:

320 Matheson Blvd West #107, Mississauga, ON L5R 3R1:

Tel: 1-647-952-9377

Email: [toronto@softdb.com](mailto:toronto@softdb.com)

Web: www.softdb.com

1. Execution
   1. SYSTEM DESIGN
      1. Design system according to manufacturer’s specifications and conforming to requirements in this specification.
   2. EXAMINATION
      1. Ensure that facility build out is at a stage suitable for the system installation.
      2. Ensure that facility is constructed according to plans including wall locations, ceiling types and plenum barriers.
      3. Ensure that the plenum height is appropriate as per manufacturer’s recommendations and as per plan.
      4. Ensure power requirements have been provided as per plan.
      5. Ensure sufficient space for centrally located components is available as per plan and manufacturer’s specifications.
      6. Ensure any third-party components required to be interfaced with the system have been provided.
   3. PERMITS
      1. Obtain necessary permits for installation work.
   4. INSTALLATION
      1. Follow all applicable codes for the area.
      2. Follow manufacturer’s recommendations regarding installation as found in the manufacturer’s installation manual.
      3. Follow the system design for location of loudspeakers and wiring.
      4. Install below-ceiling equipment in a location determined by the client.
      5. Cabling shall be installed:
         1. To avoid damage to cable conductors or housing. Damaged cable shall be replaced.
         2. To provide strain relief at each speaker/component location.
         3. Such that multiple cables between in-ceiling components shall be bundled together at intervals not exceeding 1.8m (6’).
         4. Such that, in open ceiling environments, cables shall be properly supported in at least one location mid-point between speakers/components.
         5. Near the deck. Cables shall not rest on the ceiling tile.
      6. Record any necessary on-site changes to the system design on the plan and include in final system documentation.
      7. Connect all power to dedicated electrical circuits. Total power consumption shall not exceed breaker amperage.
      8. Ensure that supplementary materials used meet applicable safety standards.
   5. FIELD QUALITY CONTROL
      1. Ensure that plenum heights meet the minimum recommended by the manufacturer for the loudspeakers.
      2. Ensure that distance between the top of the loudspeaker and the deck meets manufacturer’s minimum specifications.
      3. Ensure that loudspeakers are suspended in a level manner.
      4. Ensure that loudspeakers are not obstructed as much as possible.
      5. Ensure cables are properly supported in the ceiling.
      6. Ensure cables are securely terminated.
   6. NETWORK CONFIGURATION AND ADJUSTMENT
      1. Follow manufacturer’s procedures for system setup and commissioning as found in the system’s user manual.
   7. CLEANING
      1. Ensure that empty packaging is removed. Recycle as much as possible.
      2. Ensure that any material waste is removed. Recycle as much as possible.
      3. Ensure the product is clean and presentable where required.
   8. DEMONSTRATION AND TRAINING
      1. Demonstrate operational system to customer by walking the space.
      2. Demonstrate functionality of the system to the customer or customer’s representative.
      3. Train customer employee to maintain system as required.
   9. TESTING AND REPORTING
      1. Sound masking system testing: A third-party acoustical consultant may be engaged to independently verify that the sound masking system performs to the standards set in Section 1.4.C.
      2. Measurement equipment shall be:
         1. An ANSI or IEC Type 1 or Type 2 sound analyzer with third-octave band filters.
         2. Calibrated prior to beginning the measurement process.
      3. Sound masking measurements shall be:
         1. Performed with the mechanical system operating at normal daytime levels and with all interior construction and furnishings in place.
         2. Performed in each speaker zone.
         3. Performed, to the extent possible, between rather than directly beneath the sound masking speakers.
         4. For average levels over a minimum 30 second period.
         5. Performed with the analyzer microphone positioned at a height of 5 feet 7 inches (1.7m) from the floor (average ear height when standing).
         6. Performed with the analyzer microphone at least 3.3 feet (1m) from and vertical surfaces and 2 feet (0.6m) from horizontal surfaces.
         7. Recorded for each of the frequency bands in the specified masking spectrum in Section 1.4.C.6 and for the overall dBA level.
      4. Measurement locations shall be marked and alpha-numerically referenced on facility drawings and provided as part of final system documentation.
      5. Special attention should be taken to identify any building or equipment noise that exceeds the target sound masking spectrum in a given area.
         1. In the event of such noise, mute the sound masking system and perform a third-octave measurement.
         2. Provide a report of these measurements to the client or client’s acoustical representative as a part of system verification reporting.
         3. The vendor shall nonetheless ensure that the target levels are met outside of the immediate area affected by the building or equipment noise.
      6. The sound masking vendor shall have a representative present during testing to make adjustments as identified by the acoustical consultant’s measurements.
      7. The acoustical consultant shall provide a printed report detailing system settings and final measured results.

end of section