

## 1 General

### 1.01 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

## 2 Products

### 2.01 SYSTEM DESCRIPTION

- .1 Telecommunications raceways system consists of outlet boxes, cover plates, conduits, cable trays, pull boxes, sleeves and caps, fish wires, service poles, and service fittings.
- .2 Overhead cable tray distribution system.

### 2.02 MATERIAL

- .1 Conduits: EMT type, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Cable trays: BASKET TRAY
  - .1 Description: CSA-22.2 No. 126.1, Nema 12C continuous rigid welded steel wire mesh cable management system.
  - .2 Material: Carbon Steel Wire complete with Electroplated Zinc Plating
  - .3 Inside Width: 305 mm(12 inches)
  - .4 Inside Depth: 102 mm(4 inches)
  - .5 Manufacturer's standard couplings, clamps, hangers, stabilizers, end caps, brackets, wall brackets, splice plates, reducer plates, blind ends, connectors, floor supports, rung caps, cable drop outs, and grounding straps.
  - .6 Cable drop outs, at all vertical cable transition areas.
  - .7 Barrier Strips where indicated.
  - .8 Covers and Bottom Inserts: Solid, where indicated.
- .3 Indoor service poles: provided by others.
- .4 Smoke & Acoustical Pathway:
  - .1 Description: The smoke and acoustical pathway shall contain a built-in sealing system and shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or retrofitted without the need to remove or reinstall acoustical materials. The pathway shall provide an achievable STC rating of greater than or equal to the STC rating of the specific underlying construction.
  - .2 Material: Flame Retardant Polypropylene with Low Smoke Silicone Seal.
  - .3 Pathway adjusts to accommodate wall and floor thicknesses between 4" (102 mm) & 8" (203 mm)
  - .4 Total Cable Loading Area: minimum 9000mm<sup>2</sup>(14 inch<sup>2</sup>) unless otherwise specified.
  - .5 Single-gang and Multi-gang mounting hardware as required.
- .5 Fire Rated Pathway:

- .1 Description: The fire-rated pathway shall contain a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and/or FM Systems Approved and tested to the requirements of ASTM E814 (UL1479) & CAN/ULC-S115.
- .2 Material: Galvanized steel.
- .3 Pathway adjusts to accommodate wall and floor thicknesses between 4" (102 mm) & 8" (203 mm)
- .4 Total Cable Loading Area: minimum 9000mm<sup>2</sup>(14 inch<sup>2</sup>) unless otherwise specified.
- .5 Single-gang and Multi-gang mounting hardware as required.
- .6 Fish wire: polypropylene type.

### **3 Execution**

#### **3.01 INSTALLATION**

- .1 Modify and extend existing raceway system, including overhead distribution system, fish wire, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, cable tray, service poles, miscellaneous and positioning material to constitute complete system.

#### **3.02 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

#### **3.03 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by pathways for communications systems installation.

**END OF SECTION**

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## **1 General**

### **1.01 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-C22.2 No. 214-02, Communications Cables (Bi-National standard with UL 444).
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)
  - .1 TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.
  - .2 TIA/EIA-568-B.2-(2001), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.
  - .3 TIA/EIA-568-B.3-(2000), Optical Fiber Cabling Components Standard.
  - .4 TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.

## **2 Products**

- .1 Not in contract

## **3 Execution**

### **3.01 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE**

- .1 Not in contract

### **3.02 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES**

- .1 Not in contract

**END OF SECTION**

## 1 General

### 1.01 REFERENCES

- .1 ICES-003 (Industry Canada): Interference-Causing Equipment Standard.
- .2 IEC 60065: Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements.
- .3 UL 1310: Standard for Class 2 Power Units.
- .4 UL 2043: Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; 1996
- .5 UL 6500: Standard for Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General Use.

### 1.02 SUBMITTALS

- .1 Product Data: Submit for each system component specified.
  - .1 Manufacturer Instructions: Provide manufacturer's manuals for installation, startup and commissioning.
  - .2 Shop Drawings: Provide the system design on an architectural floor plan showing the quantity, type and location of components, cabling and accessories.
  - .3 Compliance Statement: Provide a signed document from an executive officer of the supplier stating that the system as proposed meets the Design and Performance Requirements.

### 1.03 CLOSEOUT SUBMITTALS

- .1 Warranty Documentation. Provide warranty documentation, with start date(s) and service contact(s).
- .2 Record Documentation: Provide the as-built system design on an architectural floor plan showing the quantity, type and location of components, cabling and accessories.
- .3 System Reports:
  - .1 Provide reports in electronic form.
  - .2 Report an inventory of electronic system components, including model number, serial number, and firmware version.
  - .3 Report the verified quantity of speakers installed per local control zone.
  - .4 Report all system settings.
  - .5 Report testing and commissioning data.
    - .1 System Settings Backup: Provide an electronic backup file of all system settings.
- .4 Security Items:
  - .1 Provide one set of keys for each locked equipment enclosure.
  - .2 Provide passwords to access control functions for hardware and software user interfaces.

### 1.04 QUALITY ASSURANCE

- .1 Obtain required permits.

- .2 Follow applicable codes, including regulatory testing and certifications.
- .3 Source all sound masking equipment from a single supplier.
- .4 Have the system designed by an authorized manufacturer representative.
- .5 Ensure supplementary materials meet applicable standards.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- .1 Protect equipment 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.

#### **1.06 WARRANTY**

- .1 Provide a written product warranty covering sound masking components for defects in parts or assembly for a 5-year period from date of system startup.
- .2 Provide a written 1-year installation warranty.

### **2 Products (performance specification)**

#### **2.01 REGULATORY TESTING AND CERTIFICATIONS**

- .1 Safety and Electrical: IEC 60065
- .2 Electromagnetic Interference (EMI): ICES-003
- .3 Low Voltage Power Supplies: UL 1310

#### **2.02 DESIGN AND PERFORMANCE REQUIREMENTS**

- .1 System Architecture
  - .1 Provide a networked-decentralized system with addressable masking devices installed alongside the loudspeakers throughout the system area.
- .2 System Design
  - .1 Design system in accordance with manufacturer's specifications.
  - .2 Design local control zones based on:
    - .1 Drawing plan ES2.1 with all loudspeakers in one (1) zone.
- .3 System Control
  - .1 Provide digital controls for all system settings.
  - .2 Provide a networked user interface for controlling and reviewing all system settings.
- .4 Masking Sound Generation
  - .1 Provide a sound masking generator for each local control zone.
  - .2 Provide a random masking sound generator. Alternatively, provide a pseudo-random generator with a cycle exceeding 24 hours and no noticeable repetitive pattern.
- .5 Sound Masking Control

- .1 Provide each local control zone with independent control over the sound masking signal, including:
  - .1 An equalizer with at least 21 third-octave bands from 100 to 10,000 Hz.
  - .2 A volume control with 0.5 dBA increments over a range of 35 to 85 dBA, measured at a distance of one meter.
- .6 System Diagnostics
  - .1 Include the capability of identifying masking devices that are not functioning.
- .7 System Reporting
  - .1 Provide a user interface for reading and displaying all current system settings.
  - .2 Include the ability to generate detailed reports of all system settings.
- .8 Physical and Electronic Security
  - .1 House below-ceiling electronic components in a locked metal enclosure.
  - .2 Password protect access to system control functions.
  - .3 Allow all settings to be backed up to an electronic storage medium.

### 3 Execution

#### 3.01 EXAMINATION

- .1 Ensure that the site is at a stage suitable for the system installation.
- .2 Ensure that the site is constructed according to plans including wall locations, ceiling types and plenum barriers.
- .3 Ensure planned power sources have been provided.
- .4 Ensure planned space is available for centrally located components.
- .5 Ensure third-party components interfacing with the system have been provided.

#### 3.02 INSTALLATION

- .1 Follow manufacturer's installation manual.
- .2 Follow the system design for location of system components and wiring.
- .3 Record any necessary changes to the system design on the plan.

#### 3.03 SITE QUALITY CONTROL

- .1 Ensure plenum height meets manufacturer's minimum specifications.
- .2 Ensure the distance between the top of the loudspeaker and the deck meets manufacturer's minimum specifications.
- .3 Suspend loudspeakers in a level manner.
- .4 Minimize obstructions to loudspeakers.
- .5 Support cables properly in the ceiling.
- .6 Securely terminate cables.

### 3.04 SYSTEM STARTUP AND COMMISSIONING

- .1 Commissioning requirements
  - .1 The commissioning agent who is the manufacturer representative schedules functional tests through general contractor and subcontractor. Under the supervision of the commissioning agent, the installing subcontractor performs the hardware and/or software manipulations required for the testing. The consultant may be present to witness, owner maintenance staff may also be present in order to assist in system observations.
  - .2 Section 01 91 13 – General Commissioning Requirements
  - .3 Section 01 91 33 – Commissioning Forms
  - .4 Commissioning form sample attached.
- .2 Follow manufacturer's manuals for system startup.
- .3 Follow manufacturer's manuals for configuration of system, according to Owner requirements, including timer, audio, occupant controls, diagnostic, and security functions.
- .4 Commission the sound masking system with
  - .1 Ceilings fully installed,
  - .2 All furnishings in place,
  - .3 Mechanical systems operating at normal daytime levels,
  - .4 No occupant noise during measurements.
- .5 Select a commissioning location within each local control zone.
  - .1 Mark the commissioning location precisely on the as-built system design.
  - .2 Assign the commissioning location an alphanumeric ID.
- .6 Conduct third-octave sound level measurements:
  - .1 Use an ANSI Type 1 or 2 third-octave sound level analyzer.
  - .2 Set analyzer for A-weighted equivalent average level (Leq).
  - .3 Set analyzer for fast response.
  - .4 Hold the analyzer microphone oriented upwards at a height between 1.2 to 1.4 meters (4 to 4.7 feet) from the floor.
  - .5 Move the analyzer through a slow horizontal arc of at least 60 centimeters (2 feet) during the measurement period.
  - .6 Keep the analyzer at least 1 meter (3.3 feet) away from vertical or horizontal surfaces.
  - .7 Measure for at least 15 seconds.
- .7 Conduct a third-octave sound level measurement with the sound masking deactivated to document existing conditions at each commissioning location.
  - .1 Identify any third-octave band in existing conditions that exceeds the target band level for that location.
- .8 Adjust the sound masking at each commissioning location to conform to the sound masking curve and overall volume for that location, such that:
  - .1 The volume in each third-octave band from 100 Hz and 5000 Hz inclusive is within plus or minus two decibels (+/- 2 dB) of the target band level.
    - .1 Unless existing conditions exceed the maximum limit for the band.

- .2 The overall volume is within plus or minus one half decibel (+/- 0.5 dBA) of the overall volume.
  - .1 Unless existing conditions cause overall volume to exceed tolerances.
- .3 If the sound masking curve and overall volume requirements are not met at a commissioning location, modify the system design, installation or commissioning, at the supplier's expense, until conformance is achieved.
  - .1 Unless deviation can be shown to be due to existing conditions.
- .9 Provide an electronic report of testing and commissioning data, including:
  - .1 As-built system design(s) showing all commissioning locations with ID references and local control zones.
  - .2 A table and graph of commissioned sound masking measurements for each commissioning location, including:
    - .1 Third-octave levels for bands within the sound masking curve.
    - .2 Overall volume level.
    - .3 The sound masking curve, overall volume and tolerances specified for that location.
  - .3 Explanation of any sound masking measurements which exceed tolerances for the sound masking curve or overall volume with a table and graph of existing conditions measurements for each such commissioning location, including:
    - .1 Third-octave levels for bands within the sound masking curve.
    - .2 Overall volume level.

### **3.05 CLEANING AND WASTE MANAGEMENT**

- .1 Remove empty packaging and other material waste.
- .2 Clean system components where required.

### **3.06 CLOSEOUT ACTIVITIES**

- .1 Demonstrate operational system and train owner's representative in accordance with Section 01 79 00 – Demonstration & Training.
- .2 Review closeout submittals with Owner representative.
- .3 Review service and support contacts.

**END OF SECTION**