SECTION 09 80 00

ACOUSTIC ROOM COMPONENTS

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* Wenger Corporation, JR Clancy and GearBoss; Broadcast, theater and stage equipment, sound-control door assemblies, acoustic room components, lockers, storage assemblies, specialty casework, special purpose rooms, integrated controls and audio video systems.   
This section is based on the products of Wenger Corporation, JR Clancy and GearBoss, which is located at:555 Park Dr.Owatonna, MN 55060Toll Free Tel: 800-4WENGER (493-6437)Tel: 507-455-4100Fax: 507-455-4258Email: [request info (info@wengercorp.com)](https://arcat.com/rfi?action=email&company=Wenger%252BCorporation%252C%252BJR%252BClancy%252Band%252BGearBoss&message=RE%253A%2520Spec%2520Question%2520(09800wen)%253A%2520&coid=36487&spec=09800wen&rep=&fax=507-455-4258)  
Web: <https://www.wengercorp.com> | <https://www.jrclancy.com>   
 [ [Click Here](https://arcat.com/company/wenger-corporation-jr-clancy-and-gearboss-36487) ] for additional information.  
Wenger Corporation and J.R. Clancy are Your Performance Partners. In 2011, Wenger and J.R. Clancy brought together almost 200 years of experience to provide complete solutions for Performing Arts Centers and Theatres. We design, manufacture and install leading theatrical equipment worldwide from Complete Rigging Solutions and Controls to Acoustical Shell Enclosures and Orchestra Pit Fillers as well as a full-line of quality furnishings.  
Wenger Corporation provides innovative, high-quality products and solutions for performing arts and music and theatre education. For more than 65 years Wenger has been listening to what our customers need and then designing and manufacturing innovative, durable and functional products to meet those needs.  
Wenger pioneered sound isolation in practice rooms and now offers modular rooms with virtual acoustic technology (VAE) and built-in digital recording/playback. Products for music and theatre spaces include: pre-engineered acoustical doors, sound-isolating music practice rooms, acoustical shells, acoustical wall and ceiling treatment, instrument and equipment storage cabinets, portable audience seating, portable stage platforms and staging systems, music posture and portable audience chairs, orchestra pit fillers, makeup stations, tiered risers and music furniture.  
Since 1885, J.R. Clancy has been a leading designer and supplier of theatrical rigging systems, accessories and services to the theatre and entertainment industries around the world. Our team of experienced mechanical and electrical engineers, project managers, and installers provides expert technical assistance and information to architects, general contractors, theatre consultants, end users, and dealers.  
With a combination of innovative designs, outstanding quality, and a century of experience, J.R. Clancy has become the leading manufacturer of theatrical stage equipment in the United States. We provide everything from the simplest hemp sets and rigging hardware to complete, highly sophisticated motorized rigging systems-for use just about anywhere.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Acoustic Room Components Including the Following:
       1. Acoustic wall and ceiling panels. (Traditional Acoustic Panel Series).
       2. Tunable wall panels. (Dynamic Acoustic Panel Series).
       3. Motorized acoustical banners.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete sections below not relevant to this project; add others as required.

* + 1. Division 16 - Electrical for power wiring.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Society of Civil Engineers (ASCE):
       1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
    2. Architectural Woodwork Institute (AWI):
       1. Quality Manual, 8th Edition.
    3. ASTM International (ASTM):
       1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
       2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
       3. ASTM E 413 - Classification for Rating Sound Transmission.
       4. ASTM E 795 - Practices for Mounting Test Specimens during Sound Absorption Tests.
    4. International Building Code (IBC):
       1. IBC 2018, Chapter 8.
    5. Underwriter's Laboratory (UL):
       1. UL 723 - Test for Surface Burning Characteristics of Building Materials.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Provide test results by certified independent testing laboratory indicating compliance with performance requirements.
        2. Rated capacities, construction details, material descriptions, dimensions of individual components, profiles, and finishes.
        3. Delivery, storage, handling, and installation instructions and recommendations.
        4. Maintenance instructions and recommendations.
     3. Shop Drawings:
        1. Include fabrication and installation details. Distinguish between factory and field work.
        2. Include plans, elevations, sections, attachments and work by other trades.
        3. Include wiring diagrams when applicable.
     4. Verification Samples:
        1. Exposed Finishes and Finish Materials: Not less than 8 by 10 inches (200 by 250 mm), for each type, color, pattern, surface and material selected.
     5. Closeout Submittals:
        1. Operation and Maintenance Data: For adjusting, repairing and replacing components and accessories.
        2. Warranty: Submit manufacturer's warranty.
  2. QUALITY ASSURANCE
     1. Source Limitations: Obtain all products from a single manufacturer through one source providing a comprehensive material and installation package.
     2. Manufacturer Qualifications: Minimum 5 years experience in manufacture of similar products in use in similar environments, including project size, and complexity, and with the production capacity to meet the construction and installation schedule.
     3. Installer Qualifications: Experienced in installation of the work of this section and acceptable to the manufacturer.
     4. Electrical Components: Listed and labeled per NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size or quality warrant taking such a precaution. When deciding on the extent, consider all the major different types of work on the project. Show mock-up locations and required components on the architectural drawings.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and installation workmanship.
       1. Finish areas designated by Architect including shims, sealants, and accessories.
       2. Provide full size units, if accepted, units may remain as part of the completed work.
       3. Do not proceed with remaining work until workmanship is approved by Architect.
       4. Refinish mock-up area as required to produce acceptable work.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Deliver materials in manufacturer's original unopened containers with manufacturer's labels attached. Do not deliver material until spaces to receive them are clean, dry, and ready for their installation. Ship to jobsite only after roughing-in, painting and other finishing work has been completed, installation areas are ready to accept work.
     2. Handle and install materials to avoid damage.
  2. PROJECT CONDITIONS
     1. Environmental Limitations: Do not deliver or install materials until spaces are enclosed and weather tight, wet work in spaces is complete and dry, HVAC system is operating and maintaining ambient temperature at occupancy levels during the remainder of the construction period.
     2. Field Measurements: Verify field measurements as indicated on Shop Drawings. Where measurements are not possible, provide control dimensions and templates.
        1. Coordinate locations of electrical junction boxes.
     3. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
  3. WARRANTY

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Special Warranty for Acoustic Room Components: Manufacturer's written warranty indicating manufacturer's intent to repair or replace panels that fail in materials or workmanship. Failures are defined to include, but are not limited to, the following:
       1. Fracturing or breaking of unit components which results from normal wear and tear and normal use other than vandalism.
       2. Warping of components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.
       3. Failure of unit to perform acoustically in accordance with manufacturer's published data.

\*\* NOTE TO SPECIFIER \*\* Delete warranty periods not required.

* + - 1. Sound-Absorbing and Sound-Diffusing Panels Warranty Period: 5 years.
      2. Tunable Wall Panels Warranty Period: 5 years.
      3. Motorized Acoustical Banners Warranty Period: 3 years.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Wenger Corporation, JR Clancy and GearBoss, which is located at:555 Park Dr.Owatonna, MN 55060Toll Free Tel: 800-4WENGER (493-6437)Tel: 507-455-4100Fax: 507-455-4258Email: [request info (info@wengercorp.com)](https://arcat.com/rfi?action=email&company=Wenger%252BCorporation%252C%252BJR%252BClancy%252Band%252BGearBoss&message=RE%253A%2520Spec%2520Question%2520(09800wen)%253A%2520&coid=36487&spec=09800wen&rep=&fax=507-455-4258);Web: <https://www.wengercorp.com> | <https://www.jrclancy.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions shall be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
       1. Manufacturers seeking approval shall submit the following:
          1. Product data, including third-party certified acoustical data and proposed layout for this project.
          2. Samples: Submit samples of finished acoustical cloud panels and hinge.
          3. Project references: Minimum of 5 installations not less than 3 years old, with owner contact information.
          4. Sample warranty.
       2. Submit substitution request not less than required days prior to bid date.
       3. Approval shall be indicated by issuance of written Addendum.
       4. Approved manufacturers shall meet separate requirements of Submittals Article.

\*\* NOTE TO SPECIFIER \*\* Wenger tunable panels are specifically determined for appropriate quantities and location for each music rehearsal or performance space. They are typically required to allow musicians and directors to hear all ensemble parts while protecting against echoes, flutters, and unsafe sound energy levels. Delete if not required.

* 1. TRADITIONAL ACOUSTIC PANEL SERIES
     1. Basis of Design: Provide a system of acoustical panels, as manufactured by Wenger Corporation, that absorb or diffuse sound in a configuration designed to reduce excess sound energy levels and improve sound distribution throughout the space.
     2. Performance Requirements: Provide sound absorbing and sound-diffusing panels meeting requirements with the following characteristics:
        1. Wall Panel Mounting Types for Acoustical Performance Characteristics according to ASTM E 795, with measurements determined according to ASTM C 423:
           1. No air space.
        2. Ceiling Diffuser Panel Mounting Types for Acoustical Performance Characteristics according to ASTM E 795, with measurements determined according to ASTM C 423:
           1. No air space.
           2. E-150: 6 inches (152 mm) air space.
           3. E-400: 16 inches (410 mm) air space.

\*\* NOTE TO SPECIFIER \*\* Retain and edit below for projects where noise reduction and reverberation time for each listed space has been engineered to accompany a design layout of acoustic components. Copy and repeat subparagraphs below for each additional space receiving acoustic room components. Consult Wenger representative for assistance in establishing appropriate performance requirements for each space as well as proper instrumentation requirements for measurement. Delete panels not required.

* + 1. Wall and Ceiling Absorber Panels: Manufacturer's standard panel, with fabric covering laminated to front face of rigid glass-fiber board, with chemically hardened edges, with the following characteristics:
       1. Basis of Design Product: Wenger Wall Absorber Panel and Ceiling Absorber Panel/
       2. Absorber Panel Size: Width and length indicated on the Drawings.

\*\* NOTE TO SPECIFIER \*\* Delete thicknesses not required.

* + - * 1. Thickness: 2 inches (51 mm).
        2. Thickness: 3 inches (76 mm).
        3. Thickness: 4 inches (102 mm).
      1. Fabric Covering: Manufacturer's standard, color and pattern as selected.
      2. Wall Panel Mounting Method: Metal wall bracket with panel-mounted z-bracket.
      3. Ceiling Panel Mounting Method:

\*\* NOTE TO SPECIFIER \*\* Delete mounting method not required. Note that manufacturer does not offer a lay-in method of mounting.

* + - * 1. Direct mount with brackets attached to panel back.
        2. Wire suspension from brackets attached to panel back.

\*\* NOTE TO SPECIFIER \*\* Delete if 2 inch thickness not required.

* + - 1. Acoustical Performance, 2 inches (51 mm) thick, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A:
         1. 125Hz = 0.50.
         2. 250Hz = 0.96.
         3. 500Hz = 1.27.
         4. 1000Hz = 1.27.
         5. 2000Hz = 1.23.
         6. 4000Hz = 1.18.

\*\* NOTE TO SPECIFIER \*\* Delete if 3 inch thickness not required.

* + - 1. Acoustical Performance, 3 inches (76 mm) thick, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A:
         1. 125Hz = 0.65.
         2. 250Hz = 1.10.
         3. 500Hz = 1.31.
         4. 1000Hz = 1.23.
         5. 2000Hz = 1.20.
         6. 4000Hz = 1.09.

\*\* NOTE TO SPECIFIER \*\* Delete if 4 inch thickness not required.

* + - 1. Acoustical Performance, 4 inches (102 mm) thick, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A:
         1. 125Hz = 0.84.
         2. 250Hz = 1.17.
         3. 500Hz = 1.34.
         4. 1000Hz = 1.32.
         5. 2000Hz = 1.25.
         6. 4000Hz = 1.20.
    1. Convex Wall Diffuser Panels: Acoustically-configured, polycylindrical convex molded thermoplastic panel, 0.125 inch (3 mm) thick, width and length indicated, and with the following characteristics:
       1. Basis of Design Product: Wenger Type I Convex Wall Diffuser.
       2. Fabric Covering: Manufacturer's standard, color and pattern as selected.
       3. Wall Panel Mounting Method: Metal wall bracket with panel-mounted z-bracket.
       4. Sound Transmission Class (STC): ASTM E 90 and ASTM E 413: 23.
       5. Acoustical Performance, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A.
          1. 125Hz = 0.18.
          2. 250Hz = 0.18.
          3. 500Hz = 0.13.
          4. 1000Hz = 0.10.
          5. 2000Hz = 0.12.
          6. 4000Hz = 0.16.
    2. Convex Ceiling Diffuser Panels: Acoustically configured, polycylindrical convex molded thermoplastic panel, 0.125 inch (3 mm) thick, and width and length indicated.
       1. Basis of Design Product: Wenger Convex Ceiling Diffuser Panels.
       2. Finish: Manufacturer's standard textured white.
       3. Ceiling Panel Mounting Method:

\*\* NOTE TO SPECIFIER \*\* Delete mounting method not required.

* + - * 1. Direct mount with brackets attached to panel back.
        2. Wire suspension from brackets attached to panel back .
        3. Lay-in ceiling grid clip. All lay-in ceiling panels include safety cable attachment to permanent ceiling grid in all four corners of ceiling panel.
      1. Acoustical Performance, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A.
         1. 125Hz = 0.20.
         2. 250Hz = 0.11.
         3. 500Hz = 0.07.
         4. 1000Hz = 0.04.
         5. 2000Hz = 0.09.
         6. 4000Hz = 0.21.
    1. Convex Wall Diffuser/Absorber Panels: Acoustically configured, selectively sound-absorptive polycylindrical convex molded thermoplastic panel, 0.125 inch (3 mm) thick, width and length indicated, with sound attenuation board adhered to internal surface of panel.
       1. Basis of Design Product: Wenger Type II Convex Wall Diffuser Panels.
       2. Fabric Covering: Manufacturer's standard, color and pattern as selected.
       3. Wall Panel Mounting Method: Metal wall bracket with panel-mounted grooved button.
       4. Sound Transmission Class (STC): ASTM E 90 and ASTM E 413: 23.
       5. Acoustical Performance, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A.
          1. 125Hz = 0.34.
          2. 250Hz = 0.27.
          3. 500Hz = 0.14.
          4. 1000Hz = 0.11.
          5. 2000Hz = 0.11.
          6. 4000Hz = 0.19.
    2. Pyramidal Ceiling Diffuser Panels: Acoustically configured, offset pyramidal molded thermoplastic impact-resistant panel 0.125 inch (3 mm) thick, length and width indicated.
       1. Basis of Design Product: Wenger Pyramidal Ceiling Diffuser.
       2. Finish: Manufacturer's standard textured white.
       3. Ceiling Panel Mounting Method:
          1. Wire suspension from back-mounted brackets
          2. Lay-in ceiling grid clip. All lay-in ceiling panels include safety cable attachment to permanent ceiling grid in all four corners of panel.
       4. Acoustical Performance, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 48 inches (1219 by 1219 mm) unit, Mounting Type A.
          1. 125Hz = 0.27.
          2. 250Hz = 0.18.
          3. 500Hz = 0.09.
          4. 1000Hz = 0.06.
          5. 2000Hz = 0.03.
          6. 4000Hz = 0.00.
    3. Quadratic Ceiling Diffuser Panel: Acoustically diffusing panel designed in accordance with quadratic theory with multiple wells of engineered depth in a molded thermoplastic panel, 48 by 48 inches (1219 by 1219 mm) by 0.125 inch (3 mm) thick.
       1. Basis of Design Product: Wenger Quadratic Ceiling Diffuser.
       2. Finish: Manufacturer's standard white.
       3. Ceiling Panel Mounting Method: Lay-in ceiling grid. All panels include safety cable attachment to permanent ceiling grid in all four corners of panel.
       4. Unit Weight: 35 lb (16 kg).
       5. Acoustical Performance, Sound Absorption Coefficients, One-third Octave Band Center Frequency, Hz, for 48 by 96 inches (1219 by 2440 mm) unit, Mounting Type E-400.
          1. 125Hz = 0.36.
          2. 250Hz = 0.54.
          3. 500Hz = 0.59.
          4. 1000Hz = 0.43.
          5. 2000Hz = 0.24.
          6. 4000Hz = 0.19.
    4. Fabric Facing Material: 100 percent woven plain weave polyester 2-ply, with the following characteristics:
       1. Light Fastness: AATCC 16, Option 3: 40 hours.
       2. Fastness to Crocking: AATCC 8: #4 Wet & Dry.
       3. Flammability: ASTM E 84, Class A or 1.
       4. Basis of design product: Guilford of Maine, FR-701..
    5. Airborne Noise Reduction: Provide acoustical panels in layout designed by computer simulation based on Fitzroy formulas to provide the following sound reduction:
       1. Band Rehearsal: \_\_\_\_\_ dB +/- 0.5dB.
       2. Orchestra Rehearsal: \_\_\_\_\_ dB +/- 0.5dB.
       3. Choral Rehearsal: \_\_\_\_\_ dB +/- 0.5dB.
    6. Reverberation Time: Provide acoustical panels in layout designed by computer simulation based on Fitzroy formulas to provide the following reverberation times and amount of variability available in each room:
       1. Band Rehearsal: \_\_\_\_\_ +/- 0.2 seconds. Degree of change: \_\_\_\_\_ seconds.
       2. Orchestra Rehearsal: \_\_\_\_\_> +/- 0.2 seconds. Degree of change: \_\_\_\_\_ seconds.
       3. Choral Rehearsal: \_\_\_\_\_ +/- 0.2 seconds. Degree of change: \_\_\_\_\_ seconds.
    7. Fire-rating: The fully assembled product, as installed, shall meet Class A fire protection. Test results for flame spread and smoke developed shall be provided upon request. Individual component level fire test data is not sufficient to meet Class A fire protection requirements and shall not be accepted.

\*\* NOTE TO SPECIFIER \*\* Wenger Tunable Wall Panels are designed to adjust the amount of absorption and/or diffusion in a room, which affects the reverberation time and loudness of a room in order for the space to be used for both choral and instrumental rehearsal or performance. Delete if not required.

* 1. DYNAMIC ACOUSTIC PANEL SERIES
     1. Basis of Design: Provide a system of acoustical panels, as manufactured by Wenger Corporation, that absorb or diffuse sound in a configuration designed to increase or decrease the reverberation time up to .5 seconds at any time within the room.
        1. Panel Size: 4 feet x 4 feet (1219 mm x 1219 mm) and 4 feet x 8 feet (1219 mm x 2438 mm) as applicable; both sizes 12 inches (305 mm) deep.
        2. Fabric Covering: Manufacturer's standard, color and pattern as selected.
        3. Wall Panel Mounting Method: Metal wall bracket.
        4. Acoustical Performance: In compliance with manufacturer's published documentation for sound absorption.
     2. Fabric Facing Material: 100 percent woven plain weave polyester 2-ply, with the following characteristics:
        1. Light Fastness: AATCC 16, Option 3: 40 hours.
        2. Fastness to Crocking: AATCC 8: #4 Wet & Dry.
        3. Flammability: ASTM E 84, Class A or 1.
        4. Basis of design product: Guilford of Maine, Anchorage Series.
     3. Face Panel: Curved aluminum micro-perf sheet, containing absorptive and diffusive qualities.
     4. Panel End Caps: Top and bottom end caps constructed of 3/4 inch (19 mm) thick laminated composite board with 1/8 inch (3 mm) edge banding.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Woodgrain finish as scheduled or indicated. Refer to Drawings.
    1. Internal Adjustment: Absorber/Diffuser panel includes integrated steel actuator device which allows the panel to be changed to an absorber or diffuser by the use of an external handle.
    2. Side Frames: Integrated, radiused aluminum extrusions.
    3. Wall Brackets: Painted steel rail with holes to attach to wall studs, or mount to wall.

\*\* NOTE TO SPECIFIER \*\* Add requirements for engineered seismic attachment of acoustical banners if required for Project. Delete if not required.

* 1. MOTORIZED ACOUSTICAL BANNERS
     1. Basis of Design: Sound absorbing acoustical banner units, as manufactured by Wenger Corporation. comprised of housing, fabric banner, ball bearing rollers, motor, controls, mounting accessories, and other components necessary for a complete installation. Provide units meeting performance requirements and requirements listed and labeled as an assembly by UL or another testing and inspecting agency acceptable to Authorities Having Jurisdiction.

\*\* NOTE TO SPECIFIER \*\* Retain and edit below for projects where noise reduction and reverberation time for each listed space have been engineered to accompany a design layout of acoustic banners. Copy and repeat subparagraphs below for each additional space receiving acoustic banners.  
Consult Wenger representative for assistance in establishing appropriate performance requirements for each space as well as proper instrumentation requirements for measurement.

* + 1. Airborne Noise Reduction: Provide acoustical banners in layout designed by computer simulation based on Fitzroy formulas to provide the following sound reduction:
       1. Auditorium: \_\_\_\_\_ dB +/- 0.5dB.
    2. Reverberation Time: Provide acoustical absorber and diffuser panels in layout designed by computer simulation based on Fitzroy formulas to provide the following reverberation times:
       1. Auditorium: \_\_\_\_\_ +/- 0.2 seconds.

\*\* NOTE TO SPECIFIER \*\* Delete if type not required.

* + 1. Acoustical Performance, Synthetic Velour Double Layer, Sound Absorption Coefficient, ASTM C 423, one-third Octave Band Center Frequency: For banners of the following construction, spaced 9.5 inches (241 mm) from wall, with 3 inches (76 mm) between banner layers.
       1. 200 Hz = 0.35.
       2. 250 Hz = 0.59.
       3. 500 Hz = 0.70.
       4. 1000 Hz = 0.87.
       5. 2000 Hz = 0.80.
       6. 4000 Hz = 0.80.

\*\* NOTE TO SPECIFIER \*\* Delete if type not required.

* + 1. Acoustical Performance, Wool Serge Double Layer, Sound Absorption Coefficient, ASTM C 423, one-third Octave Band Center Frequency: For banners of the following construction, spaced 9.5 inches (241 mm) from wall, with 3 inches (76 mm) between banner layers.
       1. 200 Hz = 0.40.
       2. 250 Hz = 0.59.
       3. 500 Hz = 0.69.
       4. 1000 Hz = 0.87.
       5. 2000 Hz = 0.84.
       6. 4000 Hz = 0.84.
    2. Flame Resistance: Provide fabric components complying with NFPA 701.
    3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency.

\*\* NOTE TO SPECIFIER \*\* Wenger Acoustical Banners are designed to tailor the reverberation and loudness of a room. Acoustical banners are engineered to absorb sound across a broader frequency range. Standard (60 inches) width and custom widths up to 10 feet are available. Indicate banner sizes and locations on Drawings.

* + 1. Sound-Absorbing Acoustical Banners: Acoustical double-layer fabric banners with adjustable layer spacing and adjustable wall spacing, with motorized deployment and retraction, concealed when retracted within wall-mounted housing. Provide means of securing fabric allowing fabric to be easily removed for maintenance.
       1. Product: Wenger Corporation, Motorized Acoustical Banners.
       2. Banner Size: Size indicated on Drawings.

\*\* NOTE TO SPECIFIER \*\* Retain selected fabric option in "Banner Acoustical Fabric" and corresponding fabric description paragraphs below. Coordinate with corresponding coefficient in "Sound Absorption Coefficient" paragraph in Performance Requirements paragraph. If more than one fabric type or fabric color is required, note or schedule locations on Drawings.

* + - 1. Banner Acoustical Fabric: Synthetic velour front and back layer.
      2. Banner Acoustical Fabric: Wool serge front and back layer.
    1. Fabric Material:
       1. Synthetic Velour: 22 oz. (746 g/sq. m) medium weight polyester synthetic velour, inherently flame retardant, wrinkle-resistant and moisture resistant, in double layer.
       2. Wool Serge: 30 oz. /sq. yd. (1017 g/sq. m) matte finish, no nap direction, inherently flame retardant, in double layer.

\*\* NOTE TO SPECIFIER \*\* Delete color/pattern not required.

* + - 1. Colors/Patterns: As indicated on Drawings.
      2. Colors/Patterns: As selected by Architect from manufacturer's full line.
      3. Colors/Patterns: Specifier insert color selection.
    1. Housing: Manufacturer's standard enclosure consisting of aluminum extrusion frame with wood infill panels.

\*\* NOTE TO SPECIFIER \*\* Retain " Housing Closures and End Caps" paragraph below for exposed housing installations and select appropriate option.

* + - 1. Housing Closures and End Caps: Laminated wood as selected by Architect from manufacturer's standard veneers and stains.
      2. Housing Closures and End Caps: Insert housing finish description.

\*\* NOTE TO SPECIFIER \*\* Delete mounting not required.

* + - 1. Mounting: Exposed wall-mounted.
      2. Mounting: Exposed ceiling-mounted.
      3. Mounting: Above ceiling-mounted.
    1. Operator and Controls:
       1. Motor in Roller: Instant-reversing asynchronous motor of size and capacity recommended by acoustical banner manufacturer; with integrated motor controls, brakes, and encoders, permanently lubricated ball bearings, thermal-overload protection, limit switches, and positive-stop action.
       2. Power Supply: 120VAC/60 Hz.

\*\* NOTE TO SPECIFIER \*\* Retain option in "Controls" paragraph below if Owner requests ability to modify acoustical banner limit settings.

* + - 1. Controls: Provide control system utilizing main bus consisting of RS485 conductors using CAT 5 cabling, power insertion box and interface, and control switches. Provide manufacturer's address reader and limit setting tool.

\*\* NOTE TO SPECIFIER \*\* Retain and edit control description as required by Project. Coordinate with electrical drawings. Three-button control switch below is standard from Wenger. Other control options are not supplied by Wenger; consult with Wenger for recommendations.

* + - * 1. Control Switch: Remote up/down/stop control switch installed in recessed device box with cover plate. Provide number of control switches indicated for each banner or banner group.

\*\* NOTE TO SPECIFIER \*\* Delete number of optional presets not required.

* + - * 1. Provide multiple pre-set control switch with three to five preset positions.
        2. Provide multiple pre-set control switch with five to eight preset positions.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Integrated Control System: Provide interface with integrated control system scheduled and as indicated.
    1. Fasteners and Brackets: Manufacturer's standard mounting hardware for wall mount, ceiling mount, and overhead strut suspension mount as scheduled or indicated.
    2. Fabrication:
       1. Provide factory-assembled units ready for installation, shipped with banners installed and ready to deploy.
       2. Seams: Where width of banner indicated exceeds maximum width produced without seams in material specified, provide banner with horizontal seam placed in location indicated on approved shop drawings.

1. EXECUTION
   1. EXAMINATION
      1. Examine installation areas and mounting surfaces with Installer present, for compliance with manufacturer's installation tolerances including required clearances, floor level, location of blocking and anchoring reinforcements, and other existing conditions that may affect installation or performance.
      2. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
      3. Proceed with installation only after correction of unsatisfactory conditions.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION - GENERAL
      1. Install manufactured units in accordance with manufacturer's recommendations, approved submittals, and in proper relationship with adjacent construction.
      2. Clean exposed surfaces. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
   4. INSTALLATION OF ACOUSTIC ROOM COMPONENTS
      1. Install housings utilizing manufacturer's supplied brackets and fasteners recommended for application. Adjust upper and lower limits individually after installation.

\*\* NOTE TO SPECIFIER \*\*Delete if no electrically-operated units required.

* + 1. Test electrically operated units to verify that motorized acoustical banner controls, limit switches, and other operating components perform in accordance with manufacturer's written requirements.

\*\* NOTE TO SPECIFIER \*\*Delete if not required.

* 1. FIELD QUALITY CONTROL
     1. Inspect installed work to verify compliance with requirements.
        1. Verify that HVAC work and electrical work complies with manufacturer's submittals and written installation requirements.
        2. Perform installation and startup checks as recommended by manufacturer.
        3. Prepare inspection reports and submit to Architect.
  2. CLEANING AND PROTECTION
     1. Repair or replace defective work as directed by Architect upon inspection.
     2. Clean surfaces. Touch up marred finishes or replace damaged components that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by manufacturer.
     3. Protect installed products from damage, abuse, dust, dirt, stain or paint until completion of project. Do not permit use during construction.

END OF SECTION