SECTION 10 22 26.16 – vertically rising partitions

1. General
   1. SUMMARY
      1. This Section includes requirements for the supply and installation of electrically operated folding panel partitions with vertical folding configuration, and suspension system.
      2. Related Requirements:
         1. Section 05 70 00 – Decorative Metal.
         2. Section 09 22 16 – Non-Structural Metal Framing.
         3. Section 09 29 00 – Gypsum Board.
         4. Section 09 51 13 – Acoustical Panel Ceilings.
   2. REFERENCE Standards
      1. American Society for Testing and Materials International (ASTM):
         1. ASTM C423-09a; Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
         2. ASTM E90-09; Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
         3. ASTM E413-10; Classification for Rating Sound Insulation.
         4. ASTM E557-12; Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions.
      2. Underwriters Laboratories of Canada (ULC):
         1. CAN/ULC S102-18, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.
         2. CAN/ULC S109-14(R2019), Standard Method for Flame tests of Flame-Resistant Fabrics and Films.
   3. SYSTEM DESCRIPTION
      1. Folding panel partition that, when in the down position (closed) are hard, rigid, flat, plumb walls, made of a grid of rectangular acoustical panels, and when are lifted (opened), fold upward (vertically) without the use of any manual labour, in a manner similar to an accordion, into a pocket in the ceiling, between roof joists, or up between built in bulkheads. In the down (closed) position, the wall shall be comprised of two vertical planes of acoustical panels, separated by an acoustical air space.
      2. Folding panel partition shall open and close in a manner similar to an accordion, in that all wall panels fold and unfold at the exact same time, at the exact same rate. Walls that rely on the sequential folding of acoustical panels or acoustical panel sets are not acceptable.
      3. Drive systems for the folding panel partition:
         1. Standard Drive System:
            1. The motor drive assembly is mounted directly above the centre line of the operable wall. Support steel is only required at one location. Minimum wall length without modifying our system is 3430mm (11’-3”).
            2. Stack in the up (open) position into a space no greater than 1.75m wide.
      4. Folding panel partition shall be opened and closed using two spring return, 3 position key switches wired in series. Simultaneously turning the keys from the “off” position shall cause the wall to move in the designated direction “up” or “down”. When hand pressure is removed, the wall shall immediately stop. folding panel partition shall stop in a quick and positive fashion without coasting. As a normal part of the operation, it shall be possible to partially open (or close) the wall, stop it and then reverse the operation. There shall be 2 key switches per folding panel partition, located on opposite sides of the wall at opposite ends of the wall, wired in series.
      5. From a fully open position, the wall shall be able to go through its entire cycle of closing and/or opening without any manual intervention.
      6. When the folding panel partition is being lowered (closed) it shall come automatically to rest once it has reached the fully down (closed) position.
      7. When the folding panel partition is being lifted (opened) it shall come automatically to rest once it has reached the fully up (open) position.
      8. The folding panel partition shall automatically and acoustically seal against the floor without the need for any manual intervention. The floor seals shall leave a joint between the floor and the bottom acoustical panels of not more than approximately 50mm (2").
      9. The folding panel partition shall automatically and acoustically seal against the two end walls without the need for any manual intervention. The end seals shall act in such a way as not to come into contact with the end walls while the folding panel partition is in motion. The end seals shall leave a joint between the acoustical panels and the end walls of no more than approximately 25mm (1"). Seals that rub or brush against the end walls are not acceptable. Once the wall reaches the full down position, the end seals shall activate automatically. The key switch must be held for the duration of the operation.
      10. The folding panel partition shall automatically and acoustically seal against the ceiling without any manual intervention. The top seals shall leave a joint between the top acoustical panels and the ceiling of the pocket of not more than approximately 50mm (2").
      11. The folding panel partition shall open and close at a constant nominal speed of approximately 1.5 to 3 meters per minute.
      12. When the folding panel partition is being lowered (closed), it shall stop if the leading (bottom) edge comes into firm contact with any object between it and the floor. The regular operation of the wall shall resume once the key switch has been released and the direction of the wall has been reversed and the obstruction removed.
      13. The folding panel partition shall be visibly flat and rigid in the down (closed) position.
      14. There shall be no exposed hinges, brackets, screws, and no part of the mechanical system shall be visible when the folding panel partition is in the down (closed) position.
      15. All of the panel edges shall be right angled, with a minimum radius not more than 1.6mm (1/16").
      16. All of the panels shall be rectangular, nominally of the same size, unless requested otherwise by the Consultant.
      17. Joints between panel, vertical and horizontal, shall be no more than approximately 13mm (1/2") wide.
      18. Each acoustical panel shall be individually removable using only a screwdriver. No special tools or equipment shall be required. The removal of a single acoustical panel shall not affect, dislocate, or cause the removal of any adjacent panels or other acoustical panels.
      19. The folding panel partition shall be mechanically operable with a few of the acoustical panels removed from one, or both sides of the folding panel partition.
      20. The folding panel partition shall not weigh more than 39.1kg per square meter, not including the lifting equipment and the architectural finish on the acoustical panels.
      21. A completely functioning folding panel partition, tested in full accordance and compliance with ASTM E90 shall achieve a Laboratory Sound Transmission Class all (STC) rating of not less than 50.
      22. The folding panel partition shall be designed to have a design life of at least 10,000 complete closed to opened to closed cycles.
   4. SUBMITTALS
      1. Provide required information in accordance with Section 01 33 00 – Submittal Procedures.
      2. Action Submittals: Provide the following submittals before starting any work of this Section:
         1. Submit manufacturers technical data for each type of folding panel partition specified herein.
         2. Submit shop drawings showing complete layout of folding panel partition system based on field verified dimensions. The drawings shall include dimensional relationship to adjoining work. Include details indicating materials, finishes, tolerances, and methods of attachment to building steel and electrical requirements.
         3. Submit certified test reports evidencing compliance to acoustical STC requirements as specified herein.
      3. Informational Submittals: Provide the following submittals when requested by the Consultant:
         1. Certificates: Submit product certificates indicating compliance with specifications each folding panel partition, signed by product manufacturer.
         2. Source Quality Control Submissions: Submit certified test reports for folding panel partitions from recognized independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
         3. Site Quality Control Submissions: Submit written report prepared by manufacturer verifying compliance with specified performance requirements of installed materials and products.
   5. PROJECT CLOSEOUT SUBMISSIONS
      1. Operation and Maintenance Data: Submit manufacturer’s written instructions for operation and maintenance procedures, include name of original installer and contact information as follows:
         1. Panel finish facings and finishes for exposed trim and accessories; include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
         2. Seals, hardware, track, carriers, and other operating components.
   6. QUALITY ASSURANCE
      1. The products herein specified established the standard of quality for the Automatic Vertically Folding Acoustical Walls based on the basis of design product, listed within this Section.
      2. Proposals for substitution of products or techniques not conforming to these specifications must be submitted in accordance with Section 01 25 13 – Product Substitution Procedures.
      3. Independent test reports which meet the requirements and design specified herein must be submitted to obtain approval.
      4. All work and materials specified herein, shall be installed only by qualified representatives and/or installers and/or distributors of the manufacturer, according to the manufacturers written instructions.
   7. DELIVERY, STORAGE, HANDLING AND PROTECTION
      1. Deliver equipment to site in manufacturer's standard packages. Store and handle as recommended by manufacturer.
      2. Coordinate deliveries to comply with construction schedule and arrange ahead for off the ground, enclosed, under cover storage location. Do not load any area beyond the design limits. Ensure in writing safe storage and protection for the wall for the duration of the project.
      3. Materials shall be carefully checked, unloaded, stored, and handled to prevent damage.
   8. SITE CONDITIONS
      1. The floor underneath the folding panel partition along its axis shall be flat to within +/- 6mm (1-4") over the entire length of a folding panel partition. The peak to valley undulation of +/- 6mm (1/4") shall not be closer together than 610mm (24") and a peak to valley undulation of +/- 3mm (1/8") shall not be closer than 305mm (12").
      2. Support steel above the folding panel partition along its axis shall be parallel to the floor within +/-13mm (1/2") for the entire length of the folding panel partition. This includes loaded deflection. The beam must also be parallel to the centre line of the wall within + 3mm (1/8"), left to right.
      3. The fixed walls at either end of the folding panel partition shall be within +/-6mm (1/4"), from plumb vertical.
      4. The fixed walls at either end of the folding panel partition shall be flat to within +/-6mm (1/4").
   9. WARRANTY
      1. The folding panel partition shall be warranted free from defects in material and workmanship for a period of two (2) years or five thousand cycles and the parts only will be free from defect for a period of ten (10) years or five thousand cycles, whichever occurs first from date of shipment.
      2. Parts and labour required to maintain the folding panel partition and part subject to normal wear and tear are not covered under the warranty and are the Owner’s responsibility.
2. Products
   1. MANUFACTURERS
      1. Basis-of-Design Products: Products named in this Section were used as the basis‑of‑design for the project; additional manufacturers offering similar products may be incorporated into the work of this Section provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with Section 01 25 13 – Product Substitution Procedures.
      2. Additional Manufacturers: Subject to compliance with requirements specified in this Section and as established by the Basis-of-Design Materials, manufacturers offering products that may be incorporated into the Work include but are not limited to, the following:
         1. Skyfold Classic Custom powerlift partitions as manufactured by Railtech Ltd. of Baie d’Urfe (Montréal), Québec, Canada.
   2. MATERIALS
      1. Acoustical Panels:
         1. Acoustical panels faced with steel, together with sound insulation, shall be non-combustible or fire-treated materials.
         2. Acoustical panels shall be fabricated to be as stiff as possible in order to satisfy the rigid criteria when the folding panel partition is down (closed) and to ensure that there is no interference between panels when the wall is in motion.
         3. Acoustical panels shall be architecturally flat with no bowing, oil canning, warping, waviness or any other surface deformation and discontinuity.
         4. Acoustical Panels Properties and Finish:
            1. STC Rating of 55.
            2. Fabric Finish (SF-XX): As indicated in Section 09 06 05 – Product and Finish Schedule.
            3. Basis of Design Model: Skyfold Classic 55.
      2. Folding Mechanism:
         1. Hanging, folding and extension mechanism made from structural grade aluminum extrusions and structural shapes, in order to minimize the weight of the system.
         2. All wear surfaces, such as bushings, spacers, pins, discs, bearings, and sleeves shall be designed to function quietly and with minimum wear, over the 10,000-cycle design life of the folding panel partition.
         3. The hangers, which fasten the lifting mechanism to the support steel, shall be fabricated from steel and shall be welded or bolted to the support steel supplied by Section 05 70 00 – Decorative Metal.
      3. Lifting Equipment:
         1. Lifting equipment shall be sized properly so that it can open and close the wall effectively over the 10,000-cycle design life of the wall, at the minimum design speed specified above.
         2. Lifting mechanism shall be designed to function as smoothly, quietly, and safely as possible.  Wherever possible, ball bearings shall be used instead of bushings and wear surfaces. In no circumstance shall chain or belt drive systems be acceptable.
         3. There shall be a wire rope cable for every set of lifting mechanisms. Cable shall be of 6 x 31 construction aircraft cable and shall be made of galvanized steel. The diameter of the cables shall be sized so that they shall be able to hold the entire weight of the wall, with the appropriate safety factor.
         4. For the remote drive system, each wire rope cable shall wind and unwind on its own cable drum. Cable drums shall be grooved to accept single layer of cable and shall have minimum pitch diameter of 20 times the cable diameter. Length of drums shall be sufficient to accommodate 3 cable safety wraps. Cable drums shall be keyed to line shaft.  For the micro and compact drive systems, the cable wraps on yoyo drums with 2 safety wraps and multiple layers of cable.
         5. Line shaft, sized to deliver the required torque with minimum deflection, shall support and rotate the cable drums.
         6. Pillow block bearings (for the remote drive system), of appropriate size, support the line shaft and shall be located immediately on either side of each cable drum. Flange bearings shall be used for the compact drive system, located immediately on both sides of the drum assembly.
         7. For the remote drive system, the line shaft shall be connected directly to the power drive through properly sized, load rated couplings, keyed to the line shaft.
         8. Power drive shall be sized to deliver sufficient amount of torque to raise and lower the folding panel partition over its design life safely and effectively.
         9. Lifting equipment shall use the latest in industry standards in thermal protection, overload protection, quick acting fuses, etc., in order to ensure the safety and reliability of the system.
      4. Safety Equipment:
         1. Folding panel partition shall employ an electromagnetic type of brake which shall activate firmly, without hesitation, when power is lost to the system.  This brake shall have a minimum retarding torque rating equal to 200% of the power drive full load torque.  Provide manual break release lever on the motor.
         2. Folding panel partition shall employ separate dynamic brake, in order to lower the wall at controlled speed of no more than approximately 150% of the normal down speed, in the case of a catastrophic failure in the power train. Alternately, the folding panel partition shall employ a separate brake, in order to completely halt the downward motion of the wall in the case of a catastrophic failure in the power train.
         3. Folding panel partition shall employ electrical or other limit switches in order to stop the wall at its up and down travel limits.
         4. Folding panel partition shall employ an over torque detector in order to sense a jam in the system and to act as an over travel limit in the up direction should the primary limit switch fail. This over torque sensor shall be mechanical, using the motor’s torque arm in its over torque detection.
         5. The entire length of the bottom edge of the folding panel partition shall be equipped with a continuous pressure sensing strip which shall cut power to the lifting equipment and shall activate the brake, if the sensing edge comes in firm contact with an object, before the wall is in the full down (closed) position. The power shall remain cut to the lifting equipment until the key switch has been released or the direction of the wall has been reversed and the obstruction is removed.
   3. FABRICATION
      1. Factory assembles all components, assemblies, and systems into the largest possible assemblies in order to minimize the amount of assembly on site.
3. Execution
   1. EXAMINATION
      1. Inspect the relevant aspects of the site such as the evenness of the floor, walls, structural steel, etc., and ensure that these are within the tolerances stated in Part – 1 of this specification.
      2. Confirm in writing to the Consultant any deviations from these tolerances. Do not proceed until these conditions are made good.
      3. Carry out all appropriate field measurements before manufacturing any components or assemblies.
   2. INSTALLATION
      1. Install folding panel partition in accordance with the manufacturer’s printed instructions.
   3. ADJUSTING AND CLEANING
      1. Adjust and fine-tune the folding panel partition to ensure that all seals are operating and sealing properly and that the walls are in correct and smooth operation.
      2. Clean up any dirt, oil, grime, etc., that may have found its way onto the acoustical panels.  Leave the wall in a state of architectural cleanliness.

END OF SECTION