

PART 1: GENERAL

1.1 Work Included:

- 1.1.1 All applicable provisions of the Bidding and Contract Requirements, and Division 1 - General Requirements shall govern the work under this section.

1.2 Related Work (NOT INCLUDED):

- 1.2.1 The main support steel beam for the wall, as well as the miscellaneous support steel for the lifting machinery for the Automatic Vertically Retractable Acoustical Wall – Section _____.
- 1.2.2 Ceiling storage pockets along axis of Automatic Vertically Retractable Acoustical Wall – Section _____.
- 1.2.3 Bulkheads and sound insulation above, below, and in the fixed walls at both ends of the Automatic Vertically Retractable Acoustical Wall, as per ASTM E557 - Section _____.
- 1.2.4 All site wiring and connections for main power, including disconnect switches at each motor location. All site wiring and connections for control, including installation of key switches – Section _____.

1.3 System Description

1.3.1 Definition

- 1.3.1.1 Automatic Vertically Retractable Acoustical Wall (from here on called Operable Wall) shall refer specifically to acoustical operable walls that, when in the down position (closed) are made of a grid of rectangular glass/acoustical panels that are hard, rigid, flat, plumb, and when lifted (opened), nest upward (vertically) without the use of any manual labor, in a manner similar to a telescope, 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 a series of tiered vertical glass / acoustical panels, separated by an acoustical air space.

The operable wall shall open and close in a manner like a telescope, in that all wall panel rows retract from bottom to the top by nesting inside the upper panel row stage.

Standard Drive System:

The motor drive is mounted perpendicular to the wall line above the center line of the operable wall. Support steel is required at the partition and the drive location.

Minimum wall length without modifying our system is 11'-3" (3430mm).
Used for walls up to the following finished ceiling heights:

Skyfold® Prisma™ 12'-0" (3660mm)

- 1.3.1.2 The operable wall shall be opened and closed, in the standard scenario, using two touch screen operator stations. Using touch screen, press and hold the up or down directional arrow symbol on one touch screen while simultaneously pressing and holding the button symbol on the second screen shall cause the wall to move in the selected direction. When hand pressure is removed, the wall shall immediately stop. The operable wall 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 two (2) touch screens per operable wall, located on opposite sides of the wall at opposite ends of the wall, wired in series. The touch screens shall display faults in case of a failure with the electrical system.
- 1.3.1.3 From a fully open position, the operable wall shall be able to go through its entire cycle of closing and/or opening without any manual intervention.
- 1.3.1.4 When the operable wall is being lowered (closed) it shall come automatically to rest once it has reached the fully down (closed) position.
- 1.3.1.5 When the operable wall is being lifted (opened) it shall come automatically to rest once it has reached the fully up (open) position.
- 1.3.1.6 The operable wall 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 1.5" (39 mm).
- 1.3.1.7 The operable wall 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 operable wall is in motion. The end seals shall leave a joint between the acoustical panels and the end walls of no more than approximately 0.75" (19 mm). Seals that rub or brush against the end walls are not acceptable. After each section fully deploys, an acoustical seal shall activate and contact the end wall.
- 1.3.1.8 The operable wall 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 bottom edge of the pocket.
- 1.3.1.9 The operable wall shall open and close at an average speed of approximately 5 to 10 vertical feet per minute (1.5 to 3 meters per minute).
- 1.3.1.10 When the operable wall 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 wall will then automatically reverse its direction and ascend for approximately 3 seconds to clear the object. The regular operation of the wall can resume once the obstruction has been removed.

- 1.3.1.11 There shall be no exposed hinges or brackets, however many parts of the mechanical system are visible through clear glass panels when the operable wall is in the down (closed) position
- 1.3.1.12 All of the panel edges shall be right angled, with a minimum radius not more than 1/16" (1.6 mm).
- 1.3.1.13 All of the panels shall be rectangular, nominally of the same size, unless requested otherwise by the architect.
- 1.3.1.14 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.
- 1.3.1.15 The operable wall shall not weigh more than the following:
Skyfold® Prisma™ ~13.0 lbs per ft² (63.5 kg per m²)
- The preceding weight does not include the motor drive and is based on a wall 24'-0" long x 12'-0" high FC (7315mm x 3660mm) & 15'-0" beam height.
- 1.3.1.16 A completely functioning operable wall, tested in full accordance and compliance with ASTM E90 (ISO 140-3), shall achieve, from an independent laboratory, a Sound Transmission Class (STC) rating (Rw value) of not less than the following:
- Skyfold® Prisma™: System STC 52 (Rw 52)
- 1.3.1.17 The operable wall shall be designed to have a design life of at least 10,000 complete closed to opened to closed cycles.

1.4 Quality Assurance:

- 1.4.1. The products herein specified establish the standard of quality for the operable walls based on Skyfold Prisma® Automatic Vertically Retractable Acoustic Interior Glass Wall by Skyfold Inc. of Baie d'Urfe (Montréal), Québec, Canada. Proposals for substitution of products or techniques not conforming to these specifications must be submitted at least ten (10) days prior to bidding. Any proposed substitute wall must be manufactured by a certified ISO-9001-2015, ISO-14001-2015 company or an equivalent quality control system and independent test reports which meet the requirements and design specified herein must be submitted to obtain approval.
- 1.4.2. The operable walls herein specified shall be furnished and installed by an authorized local distributor licensed by the operable wall manufacturer. Local distribution is required to ensure prompt project coordination and future customer service.
- 1.4.3. The operable wall shall be designed to have a design life of at least 10,000 complete closed to opened to closed cycles.

1.5 References

- 1.5.1 ASTM E90, Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- 1.5.2 ISO 140-3, Measurement of Airborne Sound Insulation

1.6 Submittals:

- 1.6.1. Submit manufacturer's technical data for each type of operable wall specified herein.
- 1.6.2. Submit shop drawings showing complete layout of operable wall system based on field verified dimensions. The shop drawings shall include dimensional relationship to adjoining work. Include details indicating materials, finishes, and tolerances, methods of attachment to building steel and electrical requirements.

1.7 Site Conditions:

- 1.7.1. The floor underneath the operable wall along its axis shall be flat to within +/- 1/4" (6 mm) over the entire length of the operable wall. The peak to valley undulation of +/- 1/4" (6 mm) shall not be closer together than 24" (610 mm) and a peak to valley undulation of +/- 1/8" (3 mm) shall not be closer than 12" (305 mm).
- 1.7.2. Support steel above the operable wall along its axis shall be parallel to the floor within +/- 1/2" (12.7 mm) for the entire length of the operable wall. This includes loaded deflection. The beam must also be parallel to the center line of the operable wall within ± 1/8" (3 mm), left to right.
- 1.7.3. The fixed walls at either end of the operable wall shall be within +1/4" (6 mm)-0", from plumb vertical.
- 1.7.4. The fixed walls at either end of the operable wall shall be flat to within +0", -1/4" (6 mm).

1.8 Warranty:

- 1.8.1. Basic Warranty: The operable wall shall be warranted free from defects in material and workmanship for a period of two (2) years or five thousand (5,000) cycles, whichever occurs first, from the date of shipment. Extended Parts Warranty (optional): An extended warranty on parts is available in addition to the basic warranty. It includes coverage on all parts (excluding touch screen operator stations) for a period of ten (10) years or five thousand (5,000) cycles, whichever occurs first from date of shipment. Refer to Owner's manual for full warranty details.
- 1.8.2. Acoustical Performance: The operable wall shall retain its acoustical properties for 10 years from the date of shipment providing proper maintenance has been performed on the operable wall.
- 1.8.3. Parts and labor required to maintain the operable wall and part subject to normal wear and tear are not covered under the warranty and are the owner's responsibility. (Refer to Manufacturer's Recommended Maintenance Program).

PART 2: PRODUCT

2.1 Acceptable Manufacturer:

2.1.1 Manufacturer:

Skyfold Inc. Baie d'Urfe (Montréal), Québec, Canada (514) 457-4767.

Email: skyfold@skyfold.com

Website: www.skyfold.com

2.1.2 Product:

Skyfold Prisma® Automatic Vertically Retractable Acoustic Interior Glass Wall

2.1.2 Alternate systems can be used if they meet or exceed the performance criteria outlined in Part 1 - General above and if they are approved according to the provisions of 1.4.1 above.

2.2 Panel Construction:

2.2.1 Glass Panels

2.2.1.1 Panels shall be architecturally flat with no visible defects or any other surface deformation and discontinuity. Acoustical panels shall be tempered, laminated glass, ~1/2" (~12.5mm) thick.

- Laminated glass panels are in accordance with ANSI Z97.1, CPSC 1201, and ASTM C1172 standards.
- Width and Length tolerance: $\pm 3/32$ "
- Glass thickness range: 0.461" - 0.505"

2.2.1.2 The operable wall panels shall be visibly flat and rigid in the down (closed) position. The wall shall be comprised of a series of tiered vertical glass / acoustical panels, separated by an acoustical air space.

2.2.1.3 The operable wall shall not weigh more than ~13 lbs. / ft² (~63.5 Kg/m²), not including the motor drive. This is based on a wall 24'-0" long x 12'-0" high FC (7315 x 3660mm) & 15'-0" beam height.

2.2.2 Lifting Mechanism:

2.2.2.1 The hanging, folding and extension mechanism shall be, as much as possible, made from structural grade aluminum extrusions and structural shapes, to minimize the weight of the system.

2.2.2.2 All wear surfaces, such as bushings, spacers, pins, discs, bearings, sleeves shall be designed to function quietly and with minimum wear, over the 10,000-cycle design life of the operable wall.

2.2.2.3. 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 others.

2.2.3 Motor Drive:

- 2.2.3.1 The motor drive 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 in point 1.3.1.9.
- 2.2.3.2 The folding 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.
- 2.2.3.3 There shall be a wire rope cable for every set of folding mechanism. This 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.
- 2.2.3.4 The cable wraps on yoyo drums with 2 safety wraps and multiple layers of cable.
- 2.2.3.5 The line shaft, sized to deliver the required torque with minimum deflection, shall support and rotate the cable drums.
- 2.2.3.6 Flange bearings shall be used for the drive system, located immediately on both sides of the drum assembly.
- 2.2.3.7 The motor drive shall be sized to safely and effectively deliver enough torque to raise and lower the operable wall over its design life.
- 2.2.3.8 The motor drive shall use the latest in industry standards in thermal protection, overload protection, quick acting fuses, etc., to ensure the safety and reliability of the system.

2.2.4 Safety Equipment:

- 2.2.4.1 The operable wall 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. The drive system shall be equipped with a manual override and brake release lever.
- 2.2.4.2 The operable wall shall employ a dynamic brake, distinct and separate from the brake above, to lower the operable wall at a 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 operable wall shall employ a brake, distinct and separate from the brake in 2.2.4.1, in order to completely halt the downward motion of the wall in the case of a catastrophic failure in the power train.
- 2.2.4.3 The operable wall shall employ electrical or other limit switches to stop the wall at the up and down travel limits.

2.2.4.4 The operable wall shall employ an over torque detector 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 to act. This over torque sensor shall be mechanical, using the motor's torque arm in its over torque detection.

2.2.4.5 The lifting equipment shall use the latest in industry standards in thermal protection, overload protection, quick acting fuses, etc., to ensure the safety and reliability of the system.

2.2.4.6 The entire length of the bottom edge of the operable wall shall be equipped with a continuous pressure sensing strip which shall cut power to the motor drive and shall activate the brake outlined in 2.2.4.1, if the sensing edge comes in firm contact with an object, before the operable wall is in the full down (closed) position. The operable wall will automatically reverse direction and ascend for approximately 3 seconds to clear the obstruction. The power shall remain cut to the motor drive until the switches have been released. The operation of the operable wall can resume once the obstruction is removed.

2.2.5 Electrical:

2.2.5.1 The operable wall shall be equipped for a three-phase power supply to the electrical control box.

2.2.5.2 Standard electrical control box will be NEMA 1. NEMA 4 is also available upon request.

2.2.5.3 Low voltage wiring (by others). 18-gauge wiring from the switches to the control box.

2.2.5.4 Touch Screen Operator Stations (standard): Two (2), 4.3" resistive LCD touch screens, wired in series with multilingual capabilities and 4-digit adjustable user pin. The screens will display faults in case of a failure with the electrical system. (Installation and wiring by others)

Switches (optional): Two (2) push button switches wired in series with power controlled by a single, three position key switch. One switch shall be equipped with an LED that flashes fault codes in case of a failure with the electrical system. (Installation and wiring by others).

2.3 Finishes:

2.3.1 Panels: Acoustical panels shall be tempered, laminated glass, ~1/2" (~12.5mm) thick

- Laminated glass panels are in accordance with ANSI Z97.1, CPSC 1201, and ASTM C1172 standards.
- Width and Length tolerance: of $\pm 3/32"$ ($\pm 3\text{mm}$)
- Glass thickness range: 0.461" - 0.505" (11.7mm – 12.8mm)

2.3.2 Framework: Painted to match RAL code color and required gloss.

2.3.3 Sound seals: Black

PART 3: EXECUTION

3.1 Delivery and Storage:

- 3.1.1. Delivery to the job site shall be coordinated by general contractor. Proper storage of the operable walls before installation and continued protection during and after installation shall be the responsibility of the general contractor. The operable wall supplier shall not deliver or install this product until the General Contractor can ensure in writing safe storage and protection for the operable wall for the duration of the project.

3.2 Inspection:

- 3.2.1. 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 (Site Conditions) of this specification.
- 3.2.2. Confirm in writing to the General Contractor or contract manager any deviations from these tolerances. Do not proceed until these conditions are made good.
- 3.2.3. Confirm all appropriate field measurements before manufacturing any components or assemblies.

3.3 Installation:

- 3.3.1. Install operable walls in accordance with the manufacturer's printed instructions.
- 3.3.2. Installation shall be by an authorized factory trained installer.
- 3.3.3. Installation shall be in accordance with ASTM E557 installation procedure.

3.4 Adjusting and Cleaning:

- 3.4.1. Adjust and fine-tune the operable walls to ensure that all seals are operating and sealing properly and that the operable walls are in correct and smooth operation.
- 3.4.2. 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.
- 3.4.3. Each individual panel section shall be capable of opening to allow the interior glass surface to be cleaned. This operation can be performed without specialty tools.

3.5 Spare Parts:

- 3.5.1. Ensure the manufacturer has ample stock available for repairs.

END OF SECTION