LAWRENCE DOORS

General Design Considerations
ROLLING & SIDE-FOLDING DOORS, GRILLES & CLOSURES

GENERAL – The terms “door” and “doors” applies generally to all types of products including Service Doors, Grilles, Fire Doors and other closure products. If a topic refers to a specific type, it will be noted as such.

USAGE – The usage of a rolling door is determined by cycles. A cycle is defined as an action of the door from the fully closed, to the fully open, and returning to the fully closed position. The more cycles a door is designed to operate, the longer the service life that can be expected, and the less frequently a door should need to be replaced. When frequent usage is anticipated, the number of cycles per day, or the total number of cycles desired, should be specified.

WINDLOAD – Service Doors are designed to withstand a standard 20 PSF windload. If doors are to be subjected to loads greater than 20 PSF, it must be specified. Fire Doors, Counter Fire Doors, Counter Doors, Rolling & Side-Folding Grilles and Closures, or other products typically installed on interior walls are not designed to withstand specific windloads. If those products are to be subjected to windload, the requirement must be specified.

A rolling door will be operable after being subjected to a uniform constant load of 20 PSF. Curtain deformation may occur, and the door may not be operable while under load. Windload forces acting on the curtain may cause severe loadings at the jambs, transferred to the building through the guides. Building jamb construction must be designed to withstand the anticipated loads.

Windload design is based upon a door being installed on rigid jambs. When a door is installed on flexible jambs, tube supports, or other non-rigid systems, it may compromise the ability of a door to withstand the design windload.

Commonly required curtain modifications such as vision lites, fenestrations, intermediate grille sections, and wicket doors may also compromise the ability of a door to withstand the design windload.

When Fire Doors and Counter Fire Doors are subjected to windloads they should be closed prior to wind events. Loads created by wind or other types of pressures against the curtain may prevent doors from closing automatically in a fire event.

SEISMIC – Rolling door products have a substantially flexible construction that generally allows them to tolerate motion well, and standard designs are intended to adequately withstand earthquake motions. This has been demonstrated through research testing in which multiple doors in both the open and closed positions performed satisfactorily when subjected to multiple in-plane and out-of-plane seismic motions in excess of 1 g peak floor acceleration and 8% peak inter-story drift. In many cases, windload design requirements exceed the requirements for seismic design.

OTHER FORCES – Service Doors and Fire Doors can be provided with enhanced construction for resistance to forced entry, ballistics, impact, blast, and other forces.

OPENINGS – Jambs and their attachments must be designed to provide adequate support for the size, weight and intended use of the door. Factors that may cause additional stresses (windload, high cycle usage, fire resistance, etc.) should also be considered. The jambs must be large enough and located properly to allow for attachment of the guides. For proper installation of rolling doors, the jambs must extend to at least the top of the door brackets.

Jambs for Fire Doors and Counter Fire Doors must meet or exceed the minimum requirements for size and thickness as determined by their UL Listing or FM Approval. Minimum requirements may exceed normal building design requirements.

In some cases – especially on larger doors – hoods will require intermediate support(s) attached to the header, some other structure above the opening, or backing inside a finished wall, which must be located properly and provide adequate mounting and support.

On doors with full height wicket doors, the header must be designed to provide adequate mounting and support for the portion of the rolling door that is attached to it.

Steel tube supports can sometimes be used as an alternative method to provide mounting for a door where no other supports exist. They are provided as part of the door assembly and intended only to support loads imposed by the door. The tubes are typically attached to the slab and structure above. They are not structural building components.

Side-Folding Closures are supported by the top track attached to the header, which must be designed to provide adequate support for full weight of the closure in both its extended and collapsed positions.

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OPERATION METHODS – Consideration should be given to the application and use of a door when deciding the best method of operation. While a particular method of operation may be standard on a given product, it may not be appropriate for all cases. Push-up operation may not be acceptable for a door that is more than 7 feet high (or the top of the opening is more than 7 feet above the floor) and operated regularly, or operated over a deep counter or other obstruction.

Motor operation should be considered for any door that is operated regularly. Even though energy is consumed in the process of a motor operator opening and closing a door, there may be more than an offsetting benefit to the energy conserved by a door closing more quickly than when – or being left open because – it is manually operated.

Motor operators are provided standard with NEMA 1 enclosures rated for indoor use where temperatures are between 23 deg. F. (non- icing) and 122 deg. F. with less than 85% humidity (non-condensing). Motor operators can be provided with NEMA 4/12 (water, oil and dust tight), 4X (corrosion resistant / water, oil and dust tight and), or 7/9 (hazardous area "explosion proof" for Class I, Division1, Group C and D / Class II, Division1, Group E, F and G locations) enclosures rated for other environmental conditions.

SAFETY ISSUES – Safety should be a primary concern in the installation of any door. Per UL 325 requirements, motor operated doors must either be wired to require constant pressure on the close control, or be provided with a monitored device or devices that will stop and reverse a closing door upon sensing an obstruction. #

A sensing edge will stop and reverse a closing door upon contact with an obstruction and is recommended to be the primary monitored device for most applications.

Photo eyes will stop and reverse the door when they sense an obstruction between the eyes, but when they are used as the primary monitored device, they must be installed so the eyes are located 6 inches above the floor and as a result may not offer the best protection depending upon the type of traffic through the opening.

Light curtains will stop and reverse the door when they sense an obstruction between them, but cannot be used as the primary monitored device.

The use of multiple monitored sensing devices, or other supplemental devices such as motion sensors or in-ground loop detectors, may be appropriate for some applications.

Sensing devices are not available on rolling doors with wicket doors – they must be constant pressure close.

AIR INFILTRATION – Rolling doors have the greatest air infiltration around their perimeter. Doors with curved slats tend to allow more air infiltration at the guides/jambs than those with flat slats. Significant air infiltration occurs at the top of the opening between the header and the door curtain. Air infiltration can be substantially reduced by selecting a Weather-Edge Service Door with flat slats and weather seals on the exterior of the guides, a baffle built into the hood or field installed on the header, and a weather seal or sensing edge on the bottom of the bottom bar. Selecting an Insulated Door may further limit air infiltration through the interlocking slat curtain, as well as providing an added benefit of temperature control. Industry tests indicate that air infiltration rates for non-insulated doors without weatherseals can be expected to be as high as 4.5 CFM, while air infiltration on insulated doors with full perimeter weatherseals may be reduced to 1.0 CFM or less.

HEAT TRANSFER – Rolling doors allow heat transfer through the curtain. Heat transfer can be reduced by the use of an Insulated Door. In order to retain one of their primary benefits of coiling compactly, rolling doors cannot incorporate thick insulation into their construction. Insulation is limited to 3/4" thickness and therefore cannot provide the same level of temperature control as other types of doors that may be 2 to 4 times the thickness of a rolling door. Insulated Doors can be expected to have an average R-value of 5 when calculated per DASMA standards.

SOUND TRANSMISSION – Similar to considerations for air infiltration and temperature control, rolling doors allow sound transmission around their perimeter and through the curtain. Sound transmission can be reduced by selecting a Weather-Edge Service Door with flat slats, weather seals on the exterior of the guides, a baffle built into the hood or field installed on the header, and a weather seal or sensing edge on the bottom of the bottom bar. Selecting an Insulated Door will further reduce sound transmission through the curtain. An average STC rating of 27 can be expected for an Insulated Door.

Isolation mounts (dual isolator system utilizing neoprene strips between the guides and the wall with neoprene washers between the wall bolts and the guides) can be provided on most products# to reduce vibration and noise transmitted from a door or grille to the structure.

Isolation mounts are not available on fire doors due to flame spread and smoke generation of the neoprene, or on doors with windlocks.

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RECYCLED CONTENT & "GREEN" BUILDING – Most rolling door products include substantial recycled content, utilize packaging that is recyclable, and potentially offer other credits towards the ratings of "Green" buildings.

FINISHES – A condition inherent with any type of rolling door is the action of the curtain coiling upon itself as it opens, and the repeated action as it closes. This action results in continual attempts to abrade and mar the curtain finish. The extent of abrasion and marring may vary with factors such as curtain material and finish, curtain configuration, door size, frequency of usage and environmental conditions.

Scratch-Guards protection system (elasticized fabric straps spaced across the interior of the curtain) can be provided on most doors[#] to reduce finish wear.

[#] *Scratch-Guards* are not available on fire doors due to flame spread of the fabric.

CLEARANCES & ACCESS – Adequate clearances and access are required for any rolling door, both prior to and after installation. Periodic maintenance and future repairs, as well as mandatory drop-testing/resetting of Fire Doors and Counter Fire Doors, make access to door components necessary. In particular, access panels, removable ceiling system, or other means of access should be provided when a door is installed above a finished ceiling or soffit. Provisions for access should also be made for components that are concealed inside of a wall or surround. The type of access, required size and location may vary by product and field conditions.

When the curtain and bottom bar are intended to travel through a slot in a ceiling or soffit, the slot must be sufficiently wider than the bottom bar (and any projections of locking devices, sensing edges, or other accessories) to allow adequate clearance for proper door operation as well as any deflection that may occur in the curtain and bottom bar as it travels through the slot.

When the guides are intended to be concealed inside of a wall or surround, it is recommended that the tips of the guides extend ("reveal") outside of the finished wall surface (including any base or trim material) to prevent wall or finish materials from interfering with proper door operation.

Components of the building system (framing, braces, trim, soffits, conduits, lighting, ducting, etc.) are not to be attached to any part of a rolling door. Attachments may interfere with the proper operation and performance of the door and must be avoided.

ACCESSIBILITY – *Gateway*™ Egress Doors and Grilles meet building code requirements for egress out of an occupied space. "Fail-Safe" mode automatically opens the door/grille upon power loss or alarm for controlled egress. "Fail-Secure" mode will keep the door/grille closed in a power loss, but automatically open it for egress upon alarm, exit button, or secure access by first responders.

Wicket doors can be installed in most Service Doors from 5 feet wide and 8 feet high up to 20 feet wide and 16 feet high to provide personnel access into and out of a space without the need to open the rolling door. In many cases, they can be considered a code compliant exit offering ADA compliant accessibility. In some cases – such as where the floor is not level and the sill of the wicket door frame must be raised to provide adequate clearance as it swings open – they will not be ADA compliant.

When wicket doors are installed in a rolling door, they may compromise the normal windload design of the rolling door. Wicket doors are not available in rolling doors with higher than a 20 PSF windload design or doors with windlocks. In some cases, the use of a full height wicket door may be beneficial. Wicket doors may also affect the air infiltration, heat transfer, and sound transmission values of a rolling door.

When rolling doors with wicket doors are motor operated, they are limited to constant pressure close operation so it can be visually verified that the wicket door frame is in place and the curtain feeds properly into the frame when closing.

The hand of operation of the rolling door is recommended to be opposite the hand of the wicket door and is a requirement for full height wicket doors.

PATENTS – Lawrence Doors products are protected by multiple US Patents. Certain designs and features offered are exclusive to Lawrence Doors.

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