

Supplementary Information Tolerances Structural & Battery

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General Disclaimer

Since 1988, A1 Shutters Limited have manufactured, installed and exported fire curtains, fire shutters and industrial shutters. Whilst we hold over 50 testing documents and hold some of the highest global certification available, our products should only be specified by qualified architects, fire strategists design managers or local Building Control Organizations who are considered competent professionals within what is a complex and highly regulatory area. As such, whilst we can outline our product performances A1 Shutters Limited cannot guarantee that our products are appropriate for any given application.

Battery Back Up

In the event of onsite power failure, the Fire Curtains are designed to stay in the open position for a period of between 2 & 4 hours due to the trickle feed from the fire control panel to the batteries. Should the mains power not be reinstated in time, the batteries will deplete of power resulting in the fire curtains dropping under controlled descent. If this is the case then the batteries will need to be replaced and the fire control panel will need resetting. This would be a chargeable visit as the mains power supply is not covered under the terms of the warranty.



Fire Shutters & Curtains

Fire Products Structural Recommendation

The structure supporting the rolling door-set must be a fire resistant separating element to BS EN 1634-1 2014, or BS 476-22 having a fire resistance greater or equal to that required of the door-set itself. It must be capable of supporting the door-set for the required fire resistance period without compromising the fire performance of the door-set. In addition, consideration must be given to the loads imposed by the various door-set components, i.e. end plates and barrel. Our test documentation requires that a critical temperature of 400 degrees centigrade and steel sections with an Hp/A value below 230 m⁻¹ are used for designing fire resistant steel supporting sections. (see overleaf) Structure and supporting structure is by others and as such should be designed by competent professionals.

Where fire rated rolling shutters are fixed to masonry supporting elements, the masonry elements must be capable of providing a fire resistance in terms of the insulation, integrity and load bearing capacity criteria of 1634-1 equal to or greater than the fire resistance rating (integrity) of the rolling shutter assembly.

Fire shutters fitted to a timber stud partition / steel framed partition are acceptable for up to 60 minutes fire resistance, to the tested opening size of 2500 mm wide X 2400 mm high and above such sizes are subject to construction within dictates of our Extended Application to BS EN 15269-10. Indicative parameters are available at <https://fireshutter.co.uk/>

The surface/cill onto which the shutter closes must be composed of noncombustible material providing a fire resistance equal to or greater than that required from the shutter

All openings must be capable of carrying the weight of the shutter and be equal or greater than the fire resistance of the roller shutter assembly. All roller shutter weights are indicated on the approval drawings.

Safety Bearings (Fire Shutters) – Risk Assessment

All A1S Fire Shutters are tested with safety bearing which come as a standard.

Fire Alarm Requirements

Tube motor fire shutter - The relay provided by A1 requires a normally open volt free signal going closed on fire.

Conventional fire shutter - The solenoid unit requires a 24-volt D.C. signal (0.5 amps on activation)

Audio Visual unit - Requires a normally open volt free signal going closed on fire.

Fire Curtains - Require a normally closed signal going open on fire (fail-safe system)



Additional Structural Comments For Fire Rated Shutters

J.2 Modified Supporting Construction		
<p>J.2.1 Change from standard supporting construction to protected structural steel supporting construction</p>	<p>Possible providing the following applies</p> <p>A) Structural steel section factor, A/V must be less than $230m^{-1}$. Section factor to be calculated assuming section is exposed to fire on all four sides. The section factor shall be calculated as described in EN 13381-4 and EN 13381-8. This rule applies to both the vertical and the horizontal steel sections of the support frame.</p> <p>B) Fire protection system must have been shown by test to EN 13381 to maintain the steel temperature $400^{\circ}C$ or less to retain strength and minimise the effects of expansion in the steel section.</p> <p>C) The fixings securing the door to the structural steel shall be in accordance with the appended tables and must be fabricated from steel and designed not to reduce the fire performance of the steelwork fire protection system in ambient conditions or in fire conditions.</p>	<p>Possible to install into standard rigid supporting construction (as tested) or to install into protected structural steelwork subject to specified conditions.</p> <p>Note: Also tested within timber stud wall and a separate scope of approval for this application is provided in the tables appended to this report (wall specification to be as tested under WF No. 421972)</p>
K Decorative and/or protective finishes.		
<p>K.1.1 And paint finish</p>	<p>Possible in line with direct application</p>	<p>Paint finish may be added to the shutter components.</p>



EXPECTED STRUCTURAL SITE CONDITION TOLERANCES

<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Overall Structure Levels Level of floors measured relative to the intended design level at reference level Permitted deviation Δ for $H + \Delta$ $H \leq 10m$ = 15mm $10m < H < 100m$ = $0.5(H + 20)$mm $H \geq 100m$ = $0.2(H + 200)$mm Inclination Permitted deviation Δ = the smaller of 50mm or $H/(200n^{1/2})$mm where h = free storey height in mm H = free height at location = $\sum h$, in mm n = number of storeys where $n > 1$</p>	<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Elements - Columns & Walls The deviation or sum of any deviations of any individual element must not exceed the overall building structure tolerance.</p> <p>Position On Plan Position of the element centre line relative to: • At base level the intended design position. • At any upper level the actual location of the element at the level below. $l + \Delta$ Permitted deviation $\Delta = 10$mm where l = distance to centre line from gridline.</p> <p>Verticality By Storey Of The Structure Inclination of a column or wall at any level in a single or multi-storey building. Permitted deviation Δ $h \leq 10m$ = the larger of 15mm or $h/100$ $h > 10m$ = larger of 25mm or $h/600$ where h = height of element in mm</p> <p>Offset Between Floors Deviation between centrelines at floor level. Permitted deviation Δ = larger of 10mm or $l/30$mm, but not more than 20mm where t = thickness in mm = $(t_1 + t_2)/2$</p> <p>Curvature Between Adjacent Floors Curvature of an element between adjacent storey levels. Permitted deviation Δ for $h \leq 10m$ = the larger of 15mm or $h/400$ $h > 10m$ = larger of 25mm or $h/600$ where h = height of element in mm</p> <p>Level Per Storey of Structure Level of adjacent floors at supports Permitted deviation $\Delta = 10$mm where h = storey height in mm</p> <p>Distance Between Adjacent Columns & Walls Distance between adjacent columns and walls, measured at corresponding points. Permitted deviation Δ = the larger of 20mm or $l/600$, but not more than 40mm where l = distance between centre lines in mm</p>	<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Surface Straightness Flatness Flatness of surface of any element. • Basic unformed surface (Cl 8.6.2.1) Permitted global deviation $\Delta = 12$mm Permitted local deviation $\Delta = 5$mm • Ordinary unformed surface (Cl 8.6.2.2) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 3$mm • Ordinary surfaces (Cl 8.6.1.2) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 5$mm • Plain surfaces (Cl 8.6.1.3) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 3$mm</p> <p>Edge Straightness Straightness of edge of floor slab or element. Permitted deviation Δ = larger of 10mm or $a/25$mm, but not more than 20mm $l \leq 150$mm = 15mm $l = 400$mm = 15mm $l \geq 400$mm = 30mm where a = length in mm</p>	<p>Structural Steelwork Expected Structural Tolerances of Erected Components (National Structural Steelwork Specification for Building Construction 5th Edition)</p> <p>Position of Columns at Base Deviation of section centre line from the specified position = 10mm in either direction Level of Columns at Base Deviation of the top of the base plate from specified level = +/- 5mm Single storey Columns Plumb Deviation of top relative to base, excluding portal frame columns, on main axes. = +/- H/600 or 5mm whichever is greater. Max = +/- 25mm Multi-storey Columns Plumb Deviation in each storey and maximum deviation relative to base for up to 10 storeys. = +/- H/600 or 5mm whichever is greater. Max to 10 storeys = 50mm Alignment of Adjacent Perimeter Columns (critical face) Deviation relative to next column on a line parallel to the grid line when measured at base or splice. = 10mm Beam Level Deviation from specified level at supporting column. = +/- 10mm Level at Each End of Same Beam Relative deviation in level at ends = 5mm Beam Alignment Horizontal deviation relative to an adjacent beam above and below. Height < 3m = 5mm Height > 3m = H/600</p>													
<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Base Support (foundations) Base supports shall include direct foundations and pile caps, etc but not deep foundations such as piles, slurry walls, diaphragms, special anchorages, etc.</p> <p>Plan Section Permitted deviation in any direction = 25mm Vertical Section Position in the vertical direction of a base support relative to the intended design position. $h + \Delta$ Permitted deviation $\Delta = 20$mm where supporting concrete superstructure. Permitted deviation $\Delta = -15$mm + 5mm where supporting steel superstructure. where h = intended distance of foundation below datum level.</p>	<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Foundation Bolts & Similar Inserts Note: Deviations are coordinated with BS EN 1090-2: 2008 CLD.2.20</p> <p>Preset Bolt Prepared For Adjustment • Distance of centre of bolt group from intended design position. Permitted deviation = 6mm • Location of bolt at tip, from centre of bolt group. Permitted deviation $\Delta_y, \Delta_z = 10$mm Protrusion. Permitted deviation Δ_p: -5mm $\Delta_p \leq 25$mm</p> <p>Preset Foundation Bolt Not Prepared For Adjustment • Distance of centre of bolt group from intended design position. Permitted deviation = 3mm • Location of bolt at tip, from centre of bolt group. Permitted deviation $\Delta_y, \Delta_z = 3$mm • Vertical protrusion. Permitted deviation Δ_p: -5mm $\Delta_p \leq 45$mm • Horizontal protrusion. Permitted deviation Δ_x: -5mm $\Delta_p \leq 45$mm</p>	<p>Structural Concrete Expected Structural Tolerances of Concrete Frame (National Structural Concrete Specification for Building Construction 4th Edition)</p> <p>Section of Elements Cross-section Dimensions of Elements Applicable to beams, slabs, columns and other elements covering length, breadth and depth. Permitted deviation Δ for $l \leq 150$mm = 15mm $l = 400$mm = 15mm $l = 400$mm = 30mm with linear interpolation for intermediate values where l = intended dimensions in mm</p> <p>Squareness of Element Applicable to beams, slabs, columns and other elements. Permitted deviation Δ = larger of 10mm or $a/25$mm, but not more than 20mm $l \leq 150$mm = 15mm $l = 400$mm = 15mm $l \geq 400$mm = 30mm where a = length in mm</p> <p>Surface Straightness Flatness Flatness of surface of any element. • Basic unformed surface (Cl 8.6.2.1) Permitted global deviation $\Delta = 12$mm Permitted local deviation $\Delta = 5$mm • Ordinary unformed surface (Cl 8.6.2.2) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 3$mm • Ordinary surfaces (Cl 8.6.1.2) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 5$mm • Plain surfaces (Cl 8.6.1.3) Permitted global deviation $\Delta = 9$mm Permitted local deviation $\Delta = 3$mm</p> <p>Edge Straightness Straightness of edge of floor slab or element. Permitted deviation Δ = larger of 10mm or $a/25$mm, but not more than 20mm $l \leq 150$mm = 15mm $l = 400$mm = 15mm $l \geq 400$mm = 30mm where a = length in mm</p>	<p>Structural Steelwork Expected Structural Tolerances of Erected Components (National Structural Steelwork Specification for Building Construction 5th Edition)</p> <p>Position of Columns at Base Deviation of section centre line from the specified position = 10mm in either direction Level of Columns at Base Deviation of the top of the base plate from specified level = +/- 5mm Single storey Columns Plumb Deviation of top relative to base, excluding portal frame columns, on main axes. = +/- H/600 or 5mm whichever is greater. Max = +/- 25mm Multi-storey Columns Plumb Deviation in each storey and maximum deviation relative to base for up to 10 storeys. = +/- H/600 or 5mm whichever is greater. Max to 10 storeys = 50mm Alignment of Adjacent Perimeter Columns (critical face) Deviation relative to next column on a line parallel to the grid line when measured at base or splice. = 10mm Beam Level Deviation from specified level at supporting column. = +/- 10mm Level at Each End of Same Beam Relative deviation in level at ends = 5mm Beam Alignment Horizontal deviation relative to an adjacent beam above and below. Height < 3m = 5mm Height > 3m = H/600</p>													
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Permitted deviation Δ = larger of 10mm or $a/25$mm, but not more than 20mm $l \leq 150$mm = 15mm $l = 400$mm = 15mm $l \geq 400$mm = 30mm where a = length in mm</p>	<p>A1S Manufacturing Tolerances Finishes All finishes to be applied in accordance with A15 issued drawings and specification and in any event to meet with the following and British Standards and good practice current at the time of execution. Any discrepancies between A15 drawings and referred British Standards to be notified to A15 before manufacture.</p> <p>Applicable British Standards Polyester Powder Coating Steel BS 6497 ISO 13438:2005</p> <p>Polyester Powder Coating Steel Ensure galvanising coating standards have been met prior to powder coating. Any discrepancies or quality issues of the galvanising to be notified to A15 before application of powder coating finish.</p> <p>Minimum Coating Thickness</p> <table border="1"> <tr> <td>Non marine environment</td> <td>40 micron</td> </tr> <tr> <td>Marine environment</td> <td>60 micron</td> </tr> <tr> <td>Aggressive environments</td> <td>60 micron</td> </tr> <tr> <td>White coatings</td> <td>60 micron</td> </tr> </table> <p>Fabrications should be coated to the correct standard and should be free from dents, scratches, runs and over spray and should have a smooth consistent finish.</p> <p>In the case of a powder coated finish being applied of hot dipped galvanised steel, the finish of the powder coating will be directly affected and proportional to the surface finish and uniformity of the galvanised fabrication This is an inherent condition and cannot be avoided.</p>	Non marine environment	40 micron	Marine environment	60 micron	Aggressive environments	60 micron	White coatings	60 micron	<p>A1S Manufacturing Tolerances Finishes All finishes to be applied in accordance with A15 issued drawings and specification and in any event to meet with the following and British Standards and good practice current at the time of execution. Any discrepancies between A15 drawings and referred British Standards to be notified to A15 before manufacture.</p> <p>Applicable British Standards Polyester Powder Coating Aluminium BS 6496 BS EN ISO 12206-1:2004</p> <p>Polvester Powder Coating Aluminium • Non marine environment • Marine environment • Aggressive environments • White coatings</p> <p>Minimum Coating Thickness</p> <table border="1"> <tr> <td>40 micron</td> </tr> <tr> <td>60 micron</td> </tr> <tr> <td>60 micron</td> </tr> <tr> <td>60 micron</td> </tr> </table> <p>Fabrications should be coated to the correct standard and should be free from dents, scratches, runs and over spray and should have a smooth consistent finish.</p>	40 micron	60 micron	60 micron	60 micron	<p>A1S Manufacturing Tolerances Support Components Brackets & Fittings • All stock material to conform to all relevant European and British Standard production tolerances as set out in published codes. • All brackets and fittings to be manufactured in accordance with A15 issued drawings and specification. • Discrepancies to be notified to A15 before manufacture. • Brackets to be manufactured to tolerance +/- 1mm • Notes positional accuracy +/- 0.5mm • All countersinks to provide flush fitting of fixing • All brackets and fittings to be free from burrs, sharp edges, laser flash and weld spatter.</p> <p>A1S Manufacturing Tolerances Sections Angles Guides Roller Assembly Box Housing Curtain and Bottom rail</p> <p>All stock material to conform to all relevant European and British Standard Production Tolerances as set out in published codes. All roller shutter and fire curtain assemblies are manufactured in accordance with A15 issued drawings and specification. A15 to check all production tolerances are met All discrepancies are to be notified to A15 prior to manufacture.</p>
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