



MSA-ONE Building Enclosure Systems

Technical Manual Assembly and Installation

Version 1.0

MSANZ Limited

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1. GENERAL INFORMATION

1.1 Introduction

The MSA-ONE Building Enclosure System design has addressed many of the existing and pervasive quality and performance problems in respect to 'the building envelope' (walls, doors & windows) for buildings, particularly housing. MSA-ONE is a single enclosure system that achieves the highest performance results for this type of construction. When installed it will give the building: weather-tightness, thermal performance, low maintenance requirements, environmental sustainability and adaptability, and long term durability.

1.2 Description

The MSA-ONE Building Enclosure System is the entire unified and integrated enclosure for the complete building, utilising a heavy multi glazed system (toughened 8mm glass), permanent silicon rubber seals and stainless steel (316 grade) framing. MSA-ONE is a single system for the whole building enclosure, thus overcoming the difficulties associated with multiple systems and designs from multiple manufacturers referencing multiple compliance and quality criteria.

MSA-ONE is manufactured in a controlled factory environment which improves consistency, sustains the highest tolerances, and ensures the best quality control performance possible. Because it is an entire single system enclosure of a building, it reduces the risk of failure that is associated with a built construction on site that otherwise relies on the proper construction of multiple systems working together. MSA-ONE is an air-tight humidity sealed system that is designed to be very resistant to severe weather conditions and natural disasters such as earthquakes and floods. MSA-ONE addresses the need for environmentally adapted buildings that will be better suited to endure the possible environmental conditions that may result from Climate Change. MSA-ONE has raised the bar for quality and performance whilst addressing the issue of environmental sustainability using only sustainable materials both in terms of a sustainable supply from natural resources, and that are indefinitely recyclable.

1.3 Scope of Use

MSA-ONE is designed for the walls, cladding and openings to buildings and provides:

- Multi Glazed Glass Cavity Walls (clear & opaque)
- Multi Glazed Glass Cavity Windows and Doors
- Multi Glazed Vertical Sliding Frames and Wall Sections (with & without openings)
- Certified Weathertight Connectivity to MSA One-Piece Roofing System
- Certified Weathertight Connectivity to MSA Lower Weather Shield System
- Certified Weathertight Butt Joint to:
 - Concrete Floor
 - Concrete and Timber Walls
 - Concrete block Walls and Posts
 - Concrete, Steel and Timber, Post and Beams

MSA ONE System has been designed to meet the NZBC Performance Requirements, maximise thermal performance and minimise maintenance. The entire outer membrane is constructed of toughened glass and marine grade stainless steel, providing protection against extreme environmental conditions.

The MSA-ONE System weight (per m²) will vary from 65kg to 85kg. The Builder/Owner is required to engage a structural engineer for the design of the floor, post and roof structure.

MSA-ONE System is designed to be used for Residential Commercial Buildings and function in extreme conditions. It is a suitable system for the following environments:

- Extra-cold environments including high altitudes
- Exposed areas and extra-high wind zones
- Coastal and water-front locations
- Damp, cold and shaded areas
- Toxic and/or Corrosive Environments
- Suitable for Earthquake Zone design structure (subject to design by structural engineer)

1.4 Limitations

Wind Zones

All MSA-ONE Systems are suitable where the maximum wind zone is determined to be equal to or less than extra-high (55m/s) or where a specific design is employed.

Maximum Heights

MSA-ONE systems are designed to be installed to the exterior of any building to a maximum height as follows:

- | | |
|---|-------|
| • Unsupported (single glass and frame vertical span) | 5.0M |
| • Supported (multiple level separate systems per/level) | 30.0M |

Installed with other systems (weather-tightness)

MSA-ONE is primarily designed to be installed to rigid structural elements such as steel and concrete as with an MSA Building (House). Unlike other joinery systems, the MSA-ONE system is extremely rigid and will have the effect of providing rigidity to less rigid systems such as a timber framed house. MSA-ONE system is designed to be used and installed to most other systems including:

- Concrete Floor
- Concrete Walls
- Concrete block Walls and Posts
- Concrete, Steel and Timber Posts and Beams

1.5 NZ Building Code Performance

B1 Structure

The MSA One Building Enclosure System, when installed according to the manufacturer's instructions will meet performance clauses B1.3.1, B1.3.2 & B1.3.3(b)(f)(h) of the New Zealand Building Code, (NZBC)

B2 Durability

50 years. The MSA One Building Enclosure System, when installed according to the manufacturer's instructions will meet performance clauses B2.3.1(a) & B2.3.2(a) of the New Zealand Building Code, (NZBC)

E2 External Moisture

The MSA One Building Enclosure System, when installed according to the manufacturer's instructions complies with performance clause E2.3.2 of the New Zealand Building Code, (NZBC)

F2 Hazardous Building Materials

The MSA One Building Enclosure System, when installed according to the manufacturer's instructions complies with performance clauses F2.3.1 & F2.3.3 of the New Zealand Building Code, (NZBC)

H1 Thermal Performance

The MSA One Building Enclosure System, when installed according to the manufacturer's instructions complies with performance clauses H1.3.1(a) & H1.3.1(b) of the New Zealand Building Code, (NZBC)

Design Note for Thermal Performance

In order to calculate the Thermal Performance of an entire building (house) R-Values for the MSA-ONE Glazing System are necessary. The following values have been calculated using the LBNL THERM 7.4 and the LBNL WINDOWS 7.4 modelling programs. Two configurations are available:

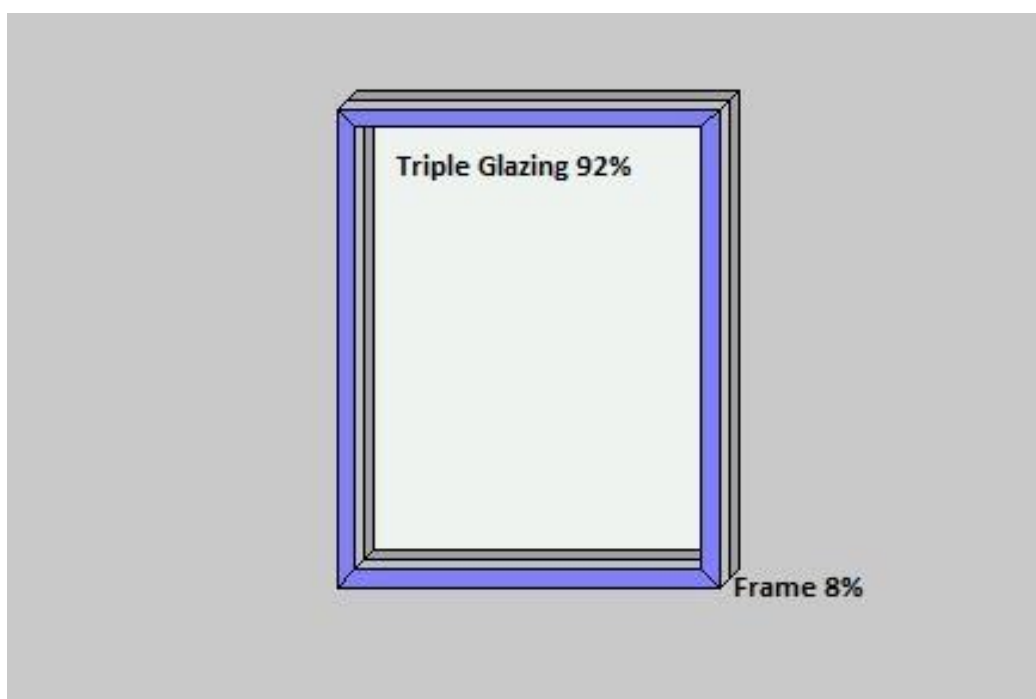
1. Double Silver Low-E
2. Single Silver Low-E

MSA-ONE System R-Values:

Argon Filled Cavities	Triple Glazed Panel	Steel Frame
Double Silver Low-E	R 1.5674	R 1.2407
Single Silver Low-E	R 1.0718	R 1.2156

The Values have been calculated using a window size of 2.0M x 1.2M. Typically, MSA-ONE Wall Panels are much larger so the calculations are based on a conservatively sized Glazed Panel.

For an MSA-ONE glazed panel measuring 2.0M x 1.2M the Stainless-Steel Frames are 8.00% of the total area of a Panel and the exposed triple glazing is 92.00% of the total area of the panel. ie



PANEL 2.0M x 1.2M	2.400 sqm
Glazing at 92%	2.208 sqm
Frame at 8%	0.192 sqm

[See Appendix 4 – MSA ONE R-Value Calculations](#)

CONSTRUCTION DETAILS

2.1 Introduction

The MSA-ONE System has been designed for mass production on an assembly line. It uses standardised componentry specified to exacting standards. Components are manufactured by MSANZ supply companies and contractors. The Glass comes in standard sizes from our glass process manufacturer. Sometimes a special size or special requirement (such as drilled holes in glass) are ordered specifically for a non-standard sub-assembly. Any supply that does not meet our minimum quality and dimensional standards, is rejected.

Some of the MSA-ONE components are cut to a standard size (length) by us within our Manufacturing (Assembly) facility, such as the extruded silicon rubber seals.

2.2 Design Note for (Structural Engineer)

The exact weight of any section of an MSA-ONE SYSTEM assembly will vary depending on the exact configuration of wall panels, doors and windows. The following is a typical section of an MSA-ONE SYSTEM assembly (see Dia 1 below), consisting of:

1. A single door (3.0 x 1.0 M) to suit a 3.0M stud height
2. A single wall panel (3.032 x 0.5 M) to suit a 3.0M stud height
3. The complete weight for this assembly is 355 Kg

Based on the example shown below (Dia 1), as described, the average weight of a typical MSA-ONE SYSTEM assembly is about 78kg /sm.

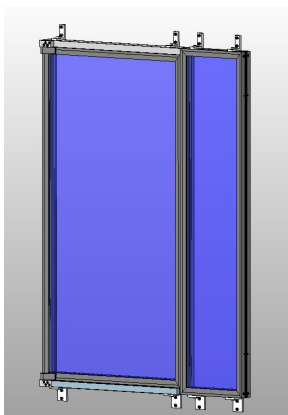
Based on the same example, but with a wall panel of 3.032 x 2.4M (typical for longer walls) the average weight of a typical MSA-ONE SYSTEM assembly is about 70kg /sm.

This weight can vary from about 65kg /sm to about 85kg /sm, for example:

- The weight of the wall panel assembly below (3.032 x 0.5 M) is 126kg or 82kgs /sm
- The weight of the door assembly below (3.0 x 1.0 M) is 230kgs or 77kgs /sm
- The weight of a single wall panel 3.032 x 2.4 M (not shown) is 490kgs or 67kgs /sm

It is recommended to use an average weight of:

- 85kgs /sm for walls with smaller MSA-ONE SYSTEM assemblies
- 75kgs /sm for larger walls with larger MSA-ONE SYSTEM assemblies
- or get an exact calculation from MSANZ Limited if it is a critical factor.



Dia 1. Assembled Frames

2.3 Glass

The Glass is ordered finished from an international supplier as a standardised component in multiple sizes. It comes in finished with no additional work to be done. The glass is toughened, ground or polished and often has been treated with a special coating (such as a Low-E coating) before it is dispatched from the supplier. Every piece is checked for imperfections and dimensional accuracy. It is assembled into the frames as delivered.

2.4 Frames and Brackets

The steel for the Frames and Brackets is imported directly from an international supplier. They first go to a contract machine shop to have all the machining operations performed such as: drilled holes, mitre angle cuts etc. When delivered to MSANZ, there is still some work to be done to them. They are welded and constructed as required in our facility. Then they move to the final assembly to install the glass and seals etc.

2.5 Extruded Seals

The MSA-ONE system utilises extruded silicon rubber seals for both the static application sealing the glass to the frames and the dynamic application to seal the door and window jambs. Extruded silicon rubber seals are also used to seal Butt Joints (sealing between two MSA-ONE systems or sealing between an MSA-ONE frame and another system such as concrete floor and walls).

2.6 Connectors and Spacers

MSA-ONE systems use aluminium extrusions to join straight and corner glass wall panels, and aluminium extruded spacer bars between the glass panes to create the thermal cavity.

2.7 Corner Joint Blocks and Straight Joint Blocks

Extruded silicon rubber corner joint blocks and straight joint blocks are unique to the MSA-ONE system design. They connect the extruded seals (that seal the glass) in a wall, door or window frame. The moulded silicon rubber Jointing Blocks negate the need for liquid sealants at the corner and straight joints.

2. ASSEMBLY AND ON-SITE INSTALLATION

3.1 Introduction

The Builder/Owner is required to engage a structural engineer to design the rigid frame structure (usually steel) in which the MSA-ONE system is to be installed. The Structural design must meet the NZBC as it applies to glass framed structures.

Note: Consideration must be given to the MSA-ONE design criteria for dimensional, fixing and weight requirements. (please refer to MSANZ for additional information)

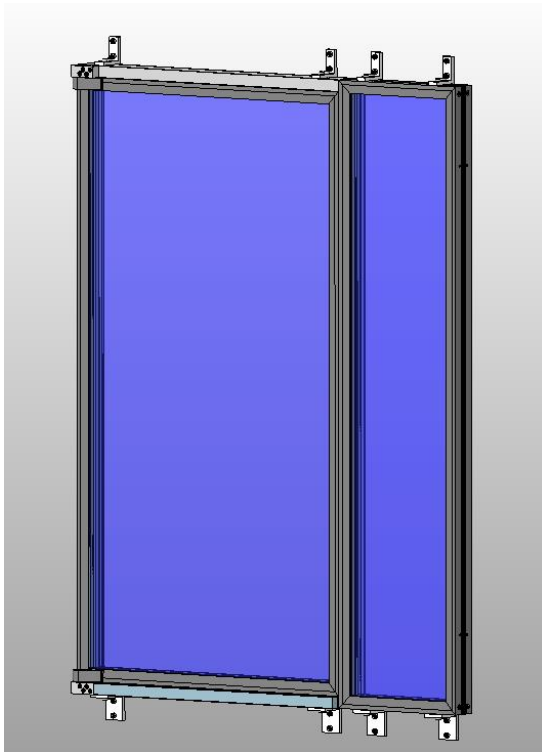
Assembly and Sub-Assembly

3.2 Assembly of the MSA-ONE Multi Glazing System

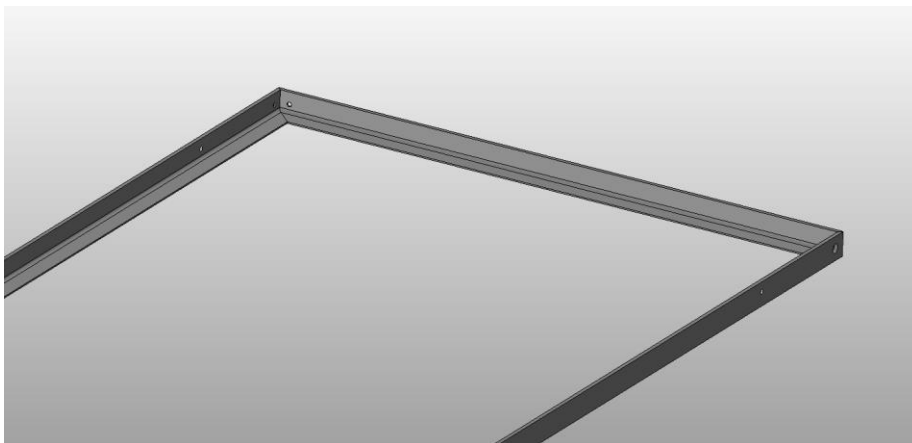
Forward:

The MSA-ONE system comprises multi glazed wall, door and windows - See Dia 1. in this example and the following examples (all of which are multi glazed panels). The 3 glass panes that make up the multi glazed assembly are clamped under pressure within stainless steel frames. There is an inner and an outer frame. The four mitred corners of the frames are fusion welded on the inside

creating a one-piece rigid structure - See Dia 2 The inner and outer frames are held together with both internal and external stainless steel brackets that are secured with stainless steel machine screws.



Dia 1. Assembled Frames

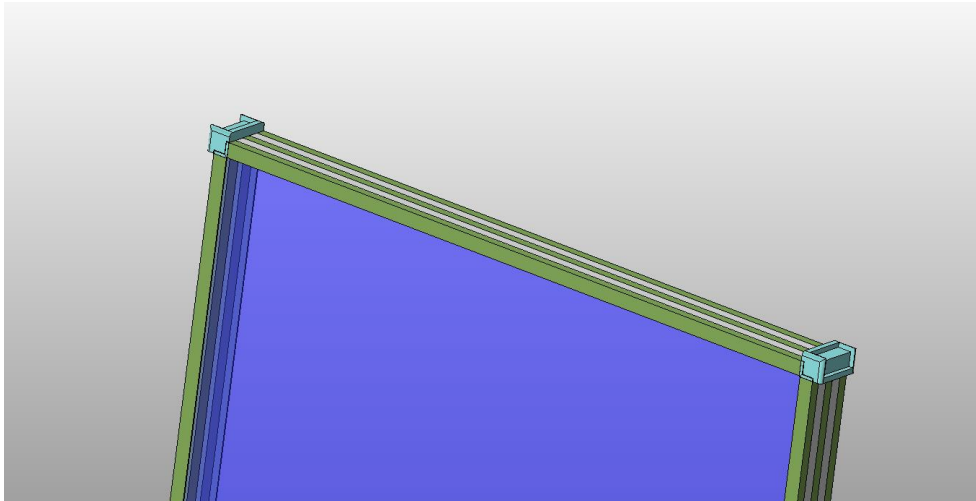


Dia 2. Inner Frame

The fully machined frame components (sides) arrive into our manufacturing plant directly from our CNC machining contractors. The mitred corners, screws holes and other machining operations are completed maintaining a tolerance of $\pm 0.1\text{mm}$. Using welding jigs and fixtures the frame component parts (the four sides) are welded to create a full frame (an inner and outer frame). The frames are fusion welded on the inside faces/corners. This process completes the finished inner and outer frames for the multi glazed walls, doors and windows.

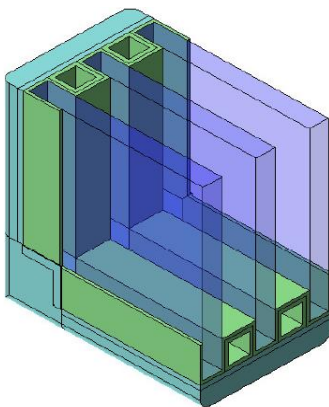
Glass assembly:

The multi glazed glass assembly is assembled separately to the frames. See Dia 3.



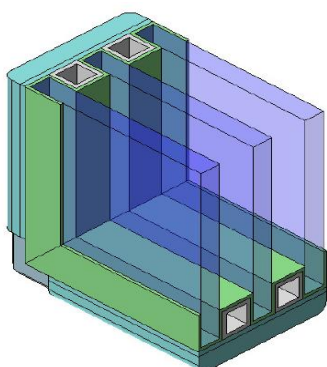
Dia 3. Glazing Assembly

Single Frame with corner jointing block (corner type 1): This pre-assembly includes: 3 panes of toughened glass, aluminium spacer bars, static extruded seal and two-way corner jointing blocks (type 1). Firstly, the three glass panes are aligned in the horizontal (one above the other). The three glass panes are held apart with 14mm temporary spacers. Then the extruded silicon rubber seals are applied which have been square cut to length. The length is calculated to position the extruded seals 12mm back from the corner of the glass panes on all four sides. Then the silicon corner jointing blocks are positioned ensuring a good fit to the extruded seals. Next the aluminium spacer bars are inserted whilst removing the temporary spacers. It is important to check the alignment of the three glass panes has not moved, and re-align them if necessary ensuring that a good fit of all components is maintained. Attach the holding clamps to maintain a good fit of all components. This completes the sub-glazing-assembly. See Dia 4.



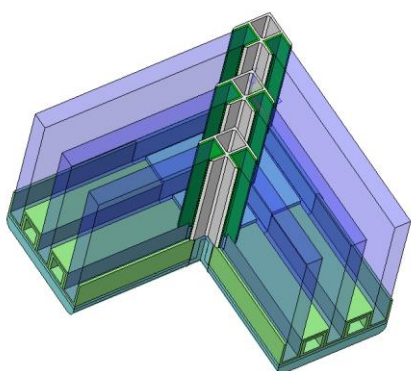
Dia 4. Assembly with silicon-rubber corner jointing blocks

Single Frame Mitred Seals without corner jointing block (corner type 2): This pre-assembly includes: 3 panes of toughened glass, aluminium spacer bars and static extruded seals. Firstly, the three glass panes are aligned in the horizontal (one above the other). The three glass panes are held apart with 14mm temporary spacers. Then the extruded silicon rubber seals are applied which are mitre cut to length. The cut length is calculated so the extruded seals align exactly with corner of the glass panes. Next apply a silicon sealant to the corner mitre joint of the four extruded seals. Then insert the aluminium spacer bars whilst removing the temporary spacers. It is important to check the alignment of the three glass panes has not moved, and re-align if necessary ensuring that a good fit of all components is maintained. Attach the holding clamps to maintain a good fit of all components. Allow at least 4 hours for the silicon sealant to harden/set. This completes the sub-glazing-assembly. See Dia.5



Drg 5. Assembly with mitred seals without corner jointing blocks

Double Frame Corner Wall joins: For the first side, follow the procedure as described for the Single Frame with or without corner jointing blocks depending on the corner type (corner type 1 or corner type 2). Note - the three panes of glass are different lengths as is necessary to create a corner wall join. The longest should be at the bottom of the stack and the shortest at the top. One side of the three glass panes should align, with the other side staggered. The staggered side is left open without an extruded static seal. Next, attach the vertical aluminium corner joining extrusions together with the extruded edge seals. Then insert the three-way silicon rubber corner jointing blocks (corner type 2) ensuring a good fit to the seals and other components (see Dia 6.) Next, using the lifting and alignment jig, connect the three return glass panes to the aluminium corner jointing extrusions ensuring a good fit and concentric alignment. Attach the holding clamps to maintain a 90-degree angle and a good fit of all components. Next, fit the extruded silicon rubber seals, silicon rubber corner jointing blocks and aluminium spacers as before. This completes the sub-glazing-assembly. Note there are two types of extruded aluminium corner jointers.

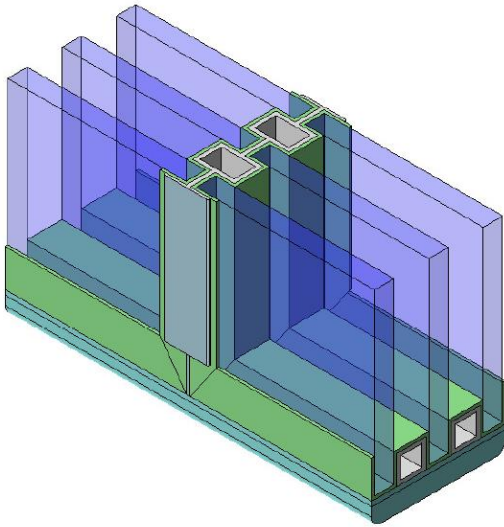


Drg 6. Wall corner assembly

Above - frameless pre-assemblies of the multi-glazed system can now be handled & moved safely.

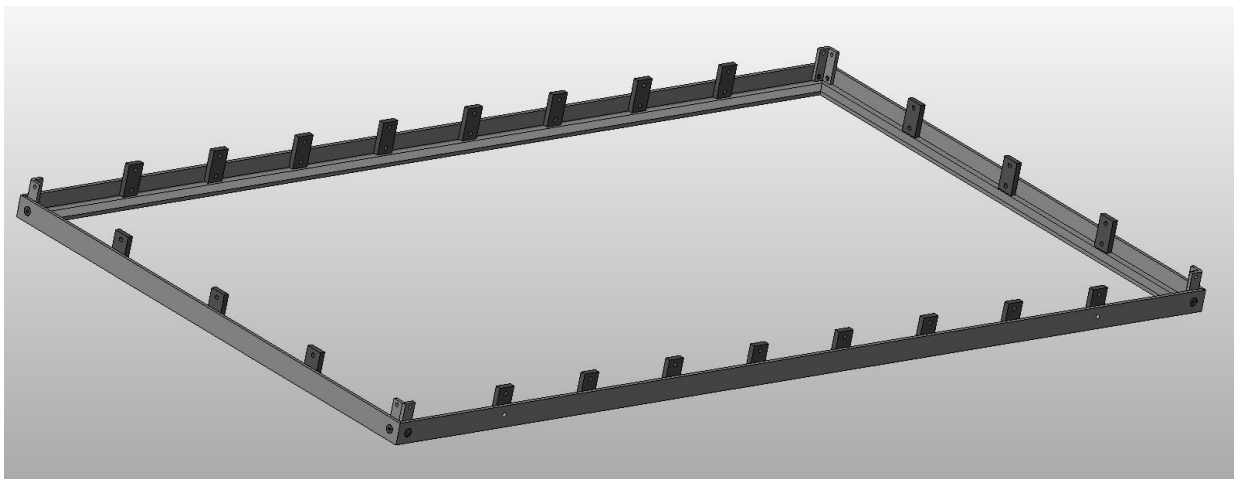
Full Panel Assembly – Frames and Glass:

Single, Double and Multiple Straight Panels:



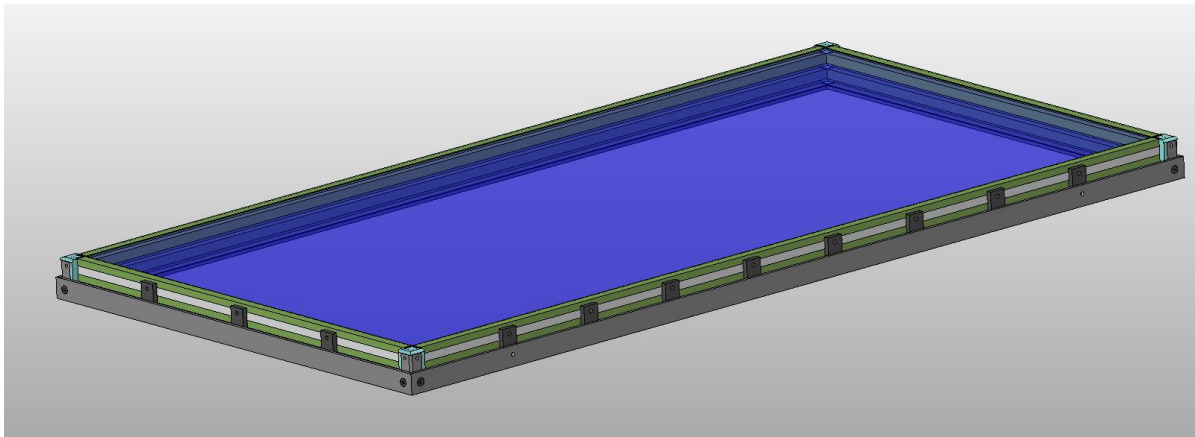
Dia 7. Straight join of multi glazed wall panels (type 1)

The outer frame is laid on its back with the connecting brackets installed. Connecting brackets come in the form of both internal and external, straight and corner brackets depending on the type of frame: a door frame for instance has only internal brackets as shown below (Dia.8), whereas a wall frame has external brackets in the horizontal plane (top and bottom) and internal brackets in the vertical plane (door jambs and butt joints).



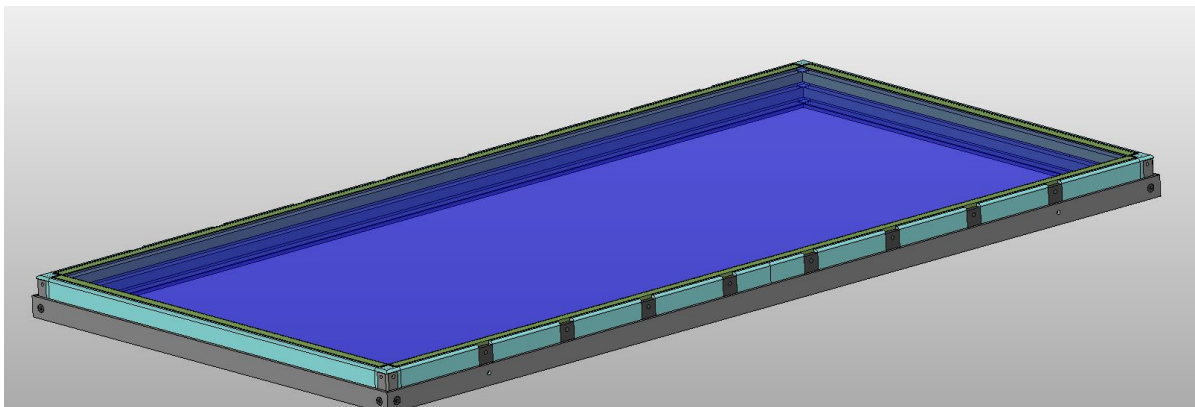
Dia 8. Frame and Connecting Brackets (internal only shown)

The seal between the glass and the inside edge of the frame is prepared (checked for imperfections and cleaned). Then the glass assembly or assemblies (three panes of glass sub-assembly with seals and spacers as described above and shown in Dia 3.) is set into the outer frame that is lying on its back on the assembly table as in Dia 9. This may be a single glass assembly or multiple assemblies laid side-by-side with silicon-rubber corner jointing blocks or mitred corners as described above (and shown in Dia 7). Note there are two types of extruded aluminium straight jointers.



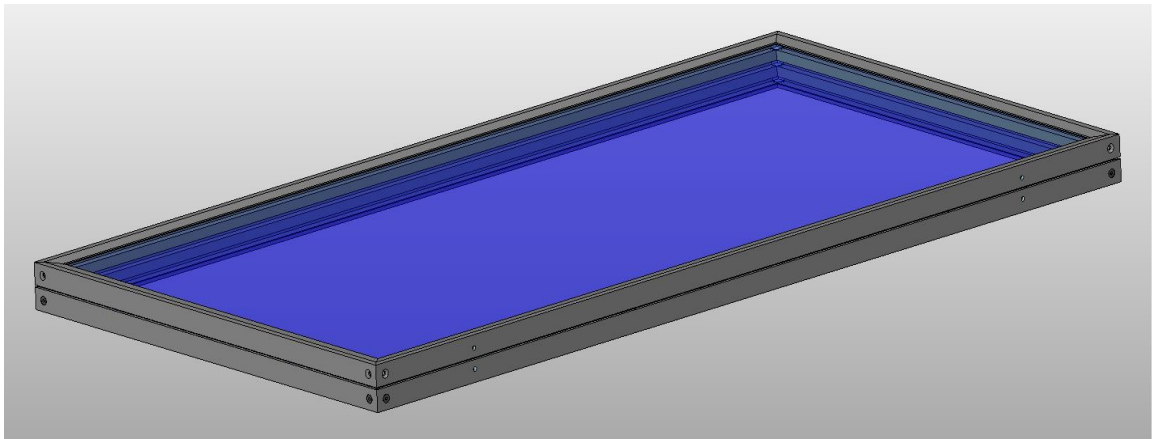
Dia 9.

Next, silicon rubber buffer extrusions are inserted between the edges of the glass and the inner faces of the frame (but not in the space between multiple panes) - see Dia 10. It is important to check the fit of the glass assembly/s to the frame and make any adjustment necessary using alternative sized buffer extrusions.



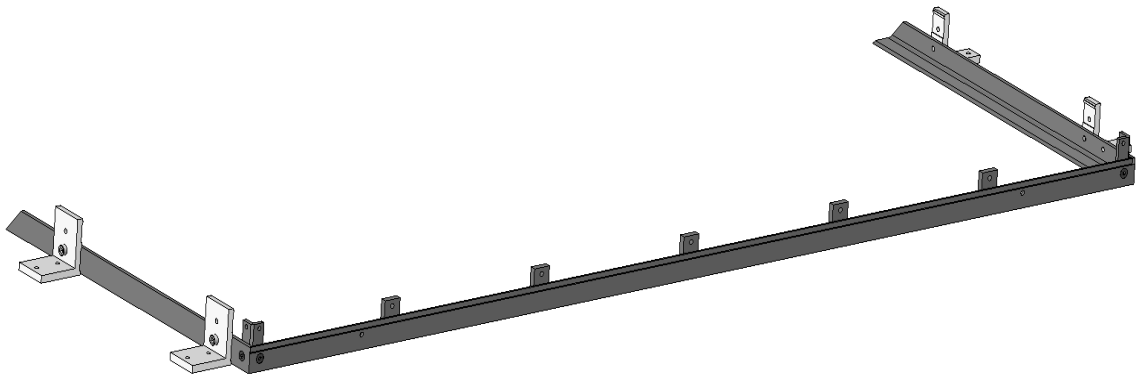
Dia 10.

The inner frame is then positioned over the glass assembly. See Dia 11. Vertical clamping is applied to the inner frame (positioned atop of the assembly) to give the correct clamping pressure for the static extruded silicon-rubber seals and the moulded silicon-rubber corner joint blocks to compress to the specified compression value. The clamping of the assembly also facilitates the bracket fixing screws holes to align. Now apply the bracket fixing screws that hold the inner and outer frames together. The alignment of the screws holes and the application of the screws allows for the exact specified clamp pressure applying to the static seals to be held and maintained. The installation pressure clamps and the glass assembly holding clamps can be removed.



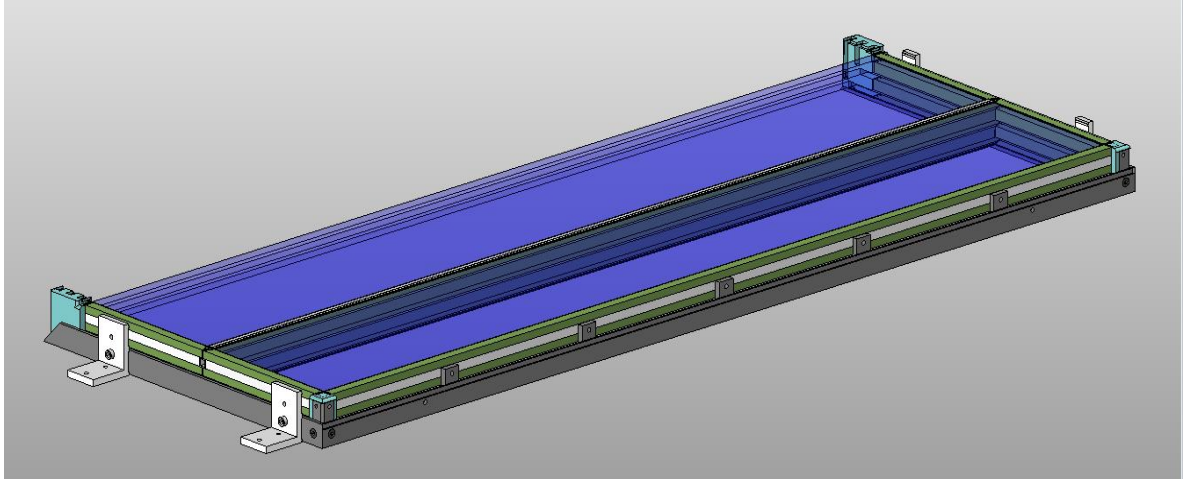
Dia 11.

Wall Corner Panels: The outer frame for one return is laid on its back with the connecting brackets installed. Connecting brackets come in the form of both internal and external, straight and corner brackets depending on the type of frame. Dia 12 shows both the internal, external and corner connecting brackets.



Dia 12.

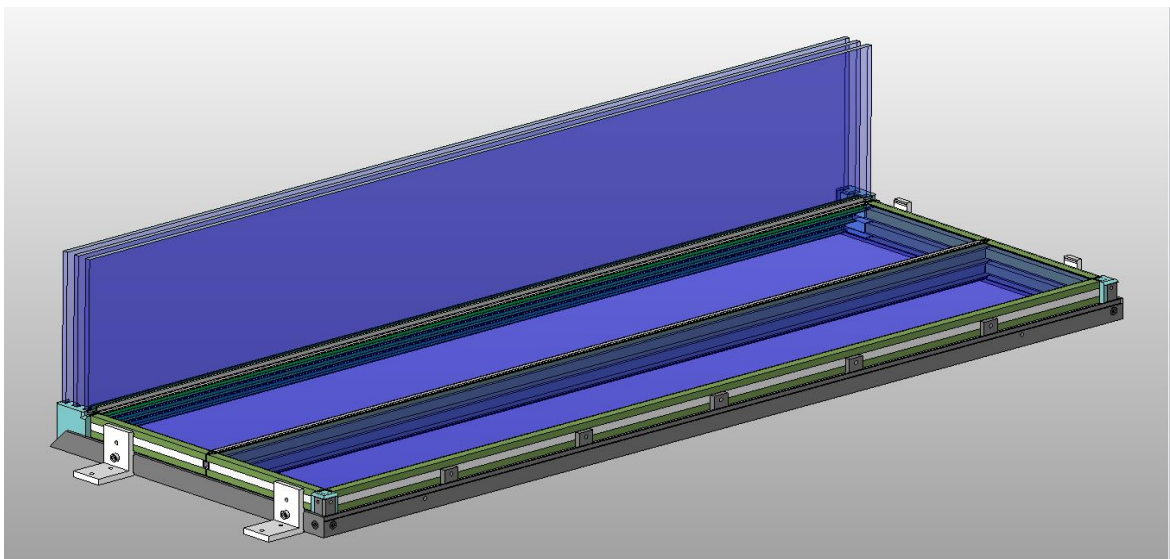
The multi glazed assembly is presented to the frame. The seal between the glazed assembly and the inside edge of the outer frame is prepared (checked for imperfections and cleaned). The multi glazed assembly/assemblies (three panes of glass sub-assembly with seals and spacers) is set into the first return outer frame that is lying on its back on the assembly table. This may be a single glass assembly or multiple assemblies laid side-by-side with silicon-rubber straight jointing blocks or mitred corners as described above. Multiple (2) triple glazed assemblies are shown below - Dia 13.



Dia 13.

Next, silicon rubber buffer extrusions are inserted between the three edges of the glass and the three inner faces of the frame (but not in the space between multiple panes). At this point it is important to check the fit of the glass assembly/s to the frame and make any adjustment necessary using alternatively sized buffer extrusions.

The three panes of glass for the second return are presented in the vertical and inserted into the aluminium corner jointing extrusions together with the extruded edge seals as shown below Dia 14.



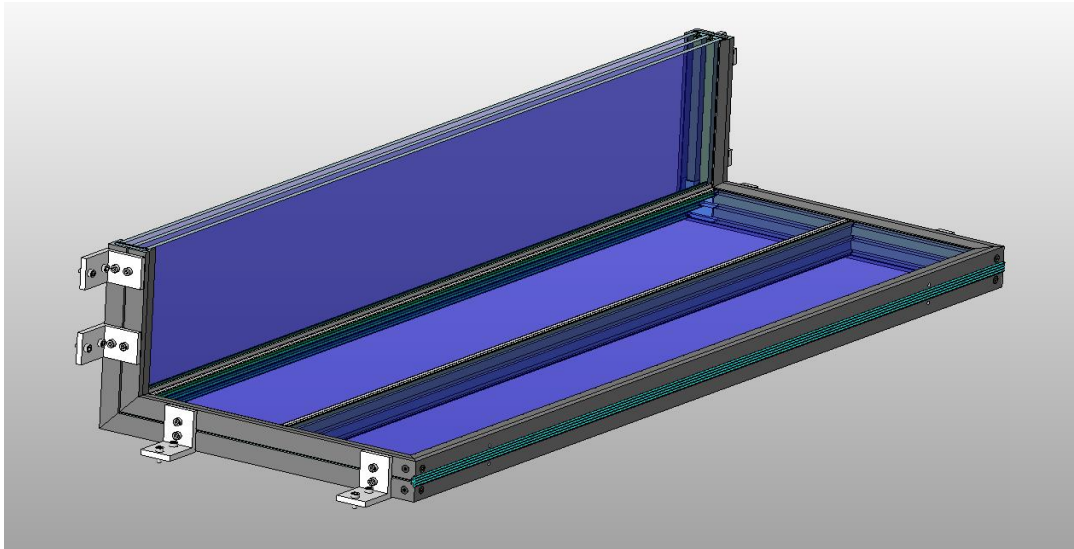
Drg 14.

The Outer frame for the second return (presented in the vertical) is positioned over the second return and affixed with the fixing brackets and machine screws to the first return frame in the horizontal position.

The inner frames for both the first and second returns are then positioned over the glass assembly - see Dia 15. Clamping is applied to the inner frames (on both returns) to give the correct clamping pressure for the static extruded silicon-rubber seals and the moulded silicon-rubber corner jointing

blocks to compress to the specified compression value. The clamping also facilitates the bracket fixing screws holes to align. Now apply the bracket fixing screws that hold the four inner and outer

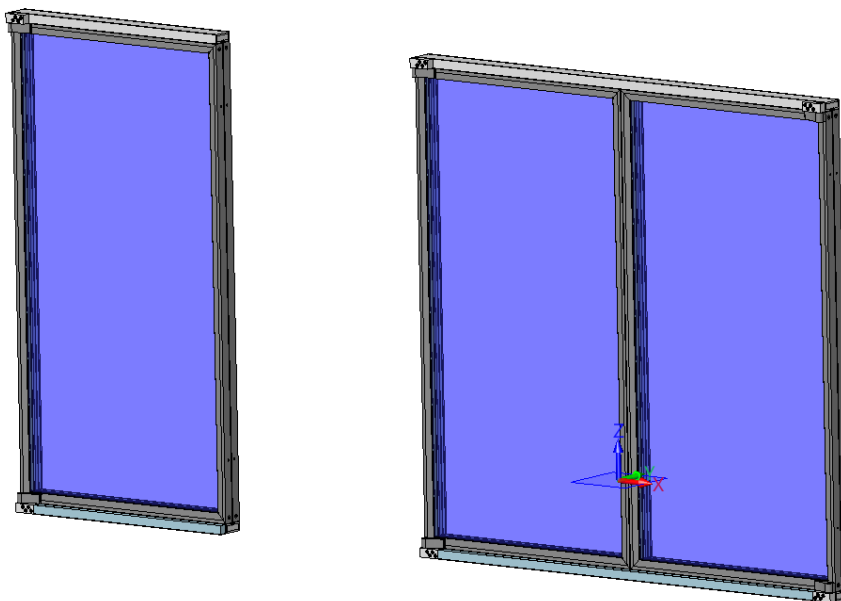
frames together. The alignment of the screws holes and the application of the screws allows for the exact specified clamp pressure applying to the static seals to be held and maintained. The installation pressure clamps and the glass assembly holding clamps can be removed – see Dia 15.



Dia 15. The complete Corner MSA-ONE Assembly with Multiple Panels

Window and Door Assembly

Windows and doors are identical in design, only the size varies. Windows and Doors use the same components, the same jambs, seals, hinge assemblies etc. Doors and windows can be single, double or bi-folding. The door/window panels are assembled as the wall panels above.



Dia 16. Single and Double Doors Assembly

The Door/s assembly does not have the vertical jambs. The vertical jambs to a door or window are part of the wall sub-assembly, so only become effective on the progressive assembly of the enclosure around the building/house. The door or window sub-assembly comprises: The door/s multi glazed sub-assembly panel/s, the bottom and top plates (jambs), and the hinge assembly.

The Hinge Blocks are bolted to the outer faces of the top and bottom jamb plates allowing for adjustment. The Hinge/s are welded to the outer frame/s of the door panel assembly. The components are assembled using the Hinge Pins to hold the assembly together. Alignment of the doors including the precise gap for the dynamic seals (door sealing) is done by adjustment of the hinge block. When the doors are perfectly aligned, the Hinge fixing screws can be tightened.

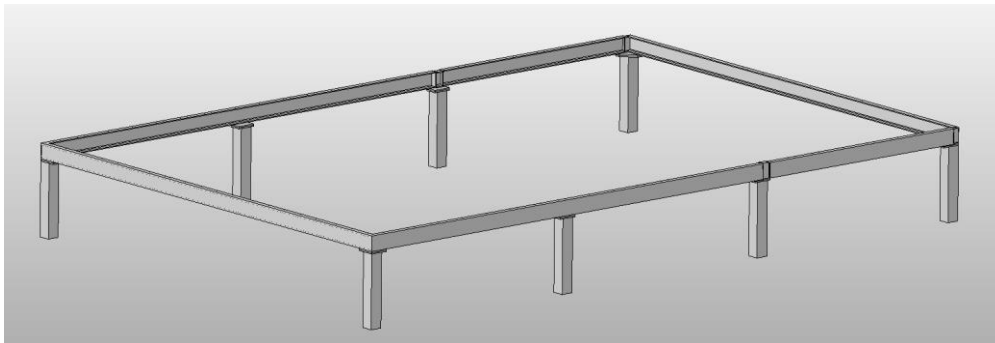
Note: at the installation of the doors/windows to the building/house and after checking the alignment, steel dowel pins between the hinge blocks and the horizontal jambs are used to maintain ongoing alignment of the doors (which are typically heavy). The Door or Window assembly is finished ready to be installed to the building.

3.3 Assembly of an MSA Building/House ON-SITE and OFF-SITE

MSA buildings/houses are designed and constructed to be built off-site. They are modular in their design which allows them to be transportation to site. In most cases modules are no wider than 8M and no longer than 16M to allow trucking without the requirement for an engineer's route report. For sites with route or access difficulties, the MSA buildings/houses will be pre-constructed in major sub-sections, such as complete wall sections that are of a size than can be containerised or transported easily, and will be assembled on-site.

1. The MSA build starts with the floor plate (and piles). The floor is concrete encapsulated by steel TFC/PFC Perimeter Beams. The TFC/PFC's are firstly cut and welded or bolted to create the Floor Plate Steel Perimeter with a required accuracy of +/- 1mm. For the build assembly on site, the piles are bolted to the frame at this point. The frame is positioned so that the piles are directly over the foundation holes in the ground, then the steel assembly is lowered so that the piles enter the ground holes. The floor plate is positioned at the specified height above the ground and levelled. The piles are not concreted in the foundation holes at this point, the assembly is still floating.

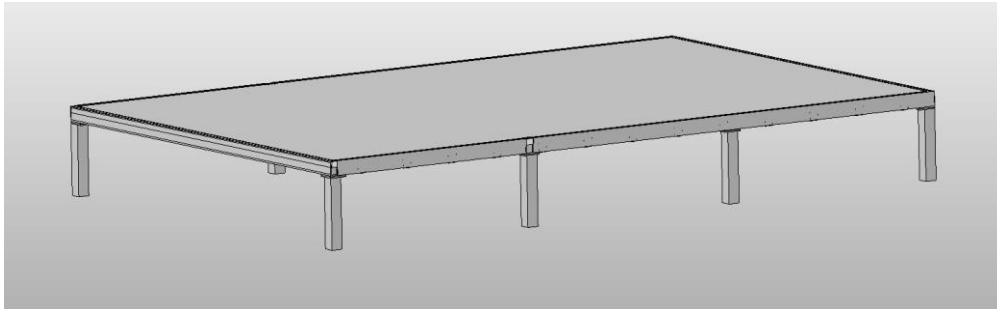
For the build assembly off-site, the piles are used temporarily to support the structure from the floor and assist in the assembly of the building/house modules. They are removed for transportation of the modules to site.



Dia 17. The Structural Floor Plate Frame and Piles

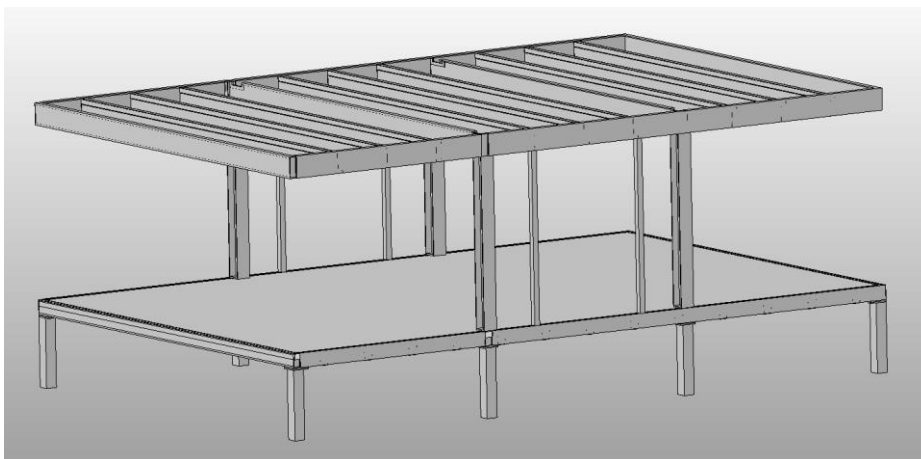
To form the concrete floor together with the structural rails, a steel mould is held under the steel Floor Plate Frame and supported by temporary steel beams below the Frame. Concrete reinforcing steel is installed. The concrete is poured and then screeded. When the concrete has sufficiently cured, the steel mould and supporting beams are removed. The finished floor plate with concrete spanning edge to edge is checked for level and accurate position. Concrete is poured into the foundation holes and left to cure. The Floor Plate is complete.

See Dia 18.



Dia 18. The Finished Floor Plate and piles

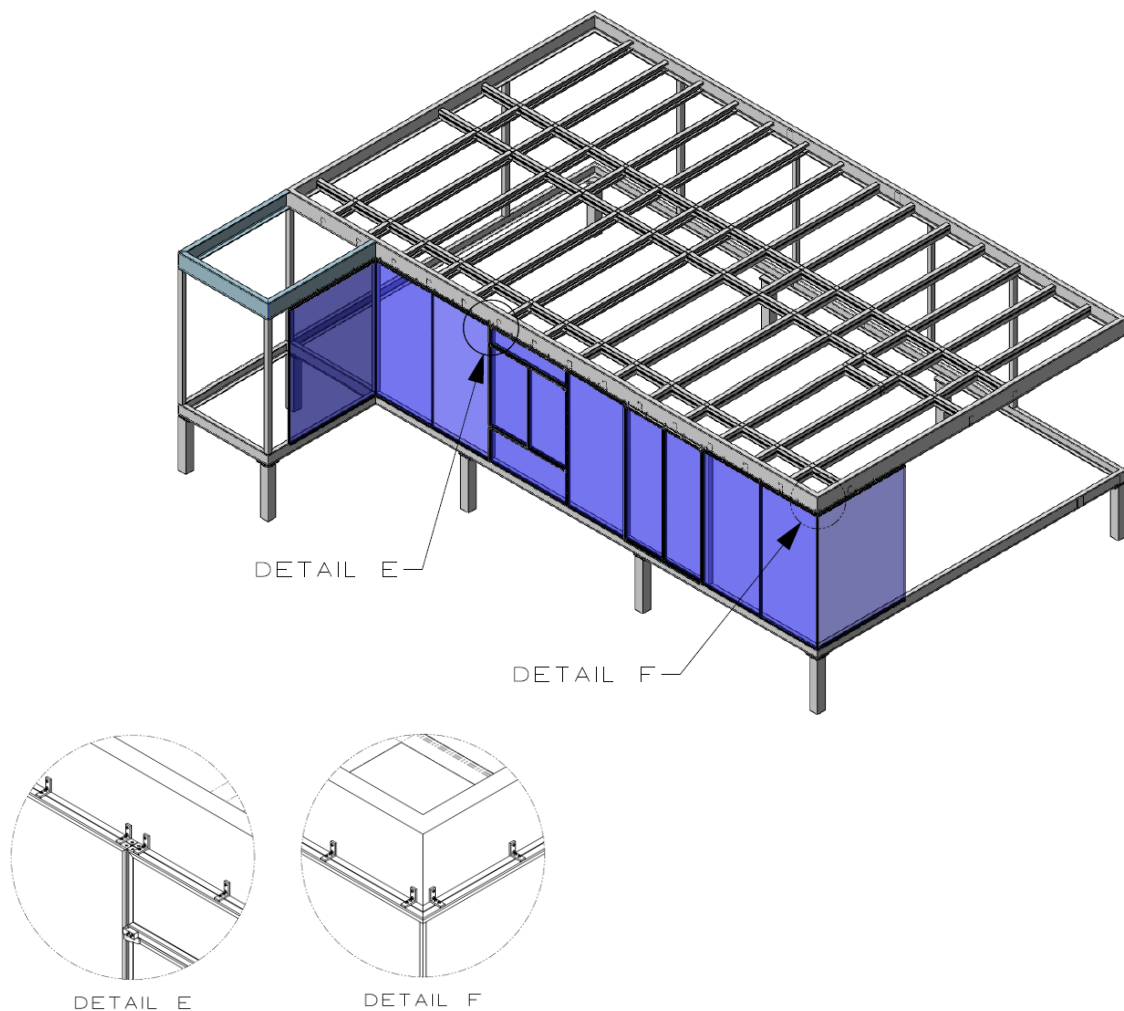
2. The structural steel columns/posts are welded or bolted (as may be specified by the structural engineer) to the steel floor plate perimeter frame. See Dia 19.
3. The perimeter roofing frame is levelled and welded or bolted (as may be specified by the engineer) to the support columns/posts. Then the Purlins and any other cross bracing as may be specified by the structural engineer are bolted or welded to the steel roof and/or building frame. See Dia 19.



Dia 19. The complete Structural Frame

4. The structural framing and concrete floor plate is complete. The build is ready for the MSA-ONE exterior enclosure, including: The multi glazed walls, doors and windows; the one-piece stainless steel membrane roof; the stainless steel lower and underfloor weather shields; and any other weather shields (flashings) that may be specified.
5. The multi glazed wall, door and window sub-assemblies that make up the entire 360-degree enclosure can now be fitted (assembled) to the structural frame of the building/house.

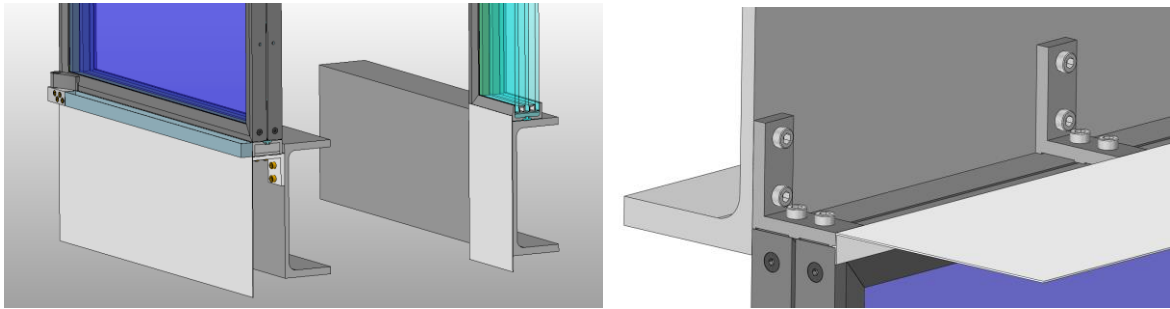
6. The multi glazed sub-assemblies are bolted to the outside of the steel floor plate and roof perimeter frames. The sub-assembly frames must be positioned accurately to achieve the correct preload (gap) for the butt seals and the door/window jamb seals. Radial alignment is achieved with steel spacers (washers) behind the mounting brackets, if required. Axial adjustment is achieved by positioning the multi glazed frames accurately. The taped fixing holes are drilled into the floor plate and roof frame in situation with minimal clearance bolt holes (+0.1 mm) to maintain accurate alignment of the assemblies.
7. The multi glazed sub-assembly frames are fixed (assembled) to the structural frame of the building/house in a one-by-one linear fashion around the house using the M8 High-Tensile cap-head machine screws. See Dia 20. The starting and ending point should be on a corner of the building/house to assist with any final radial/axial adjustments. Corner joints have greater capacity to move for fine adjustment.



Dia 20. Installation of the MSA-ONE Assemblies

8. At this point, any vertical weather shields (flashing) are installed with the silicon rubber seal.

Installation of the MSA-ONE Enclosure System: Image (below) showing the assembly (installation) of the MSA-ONE System to the building/house structural frame.



Dia 21. The MSA-ONE System showing connection to the Weather Shields and Soffit

9. **Installation of the Roofing sub-assemblies:** The parapets (including the soffits) come as separate sub-assemblies. These sub-assemblies are fitted to the multi glazed assemblies with the use of M4 dome-head stainless machine screws. Each section is welded to the next section progressively around the perimeter of the building/house. Minor adjustments prior to welding and fixing may be necessary at each corner or straight jointing of the parapet sub-assemblies.
10. **Installation of the lower weather shields:** Both the inner and outer lower weather shields are fitted to the multi glazed assemblies with the use of M4 dome-head stainless machine screws. Each section is welded to the next section progressively around the perimeter of the building/house. Minor adjustments prior to welding and fixing may be necessary at each corner or straight jointing of the parapet sub-assemblies.
11. **Installation of the under-floor weather shield:** After the plumbing, electrical and insulation etc. has been installed, the under-floor weather shields are fitted to the steel floor perimeter PFC beams with the use of stainless cap-head machine screws and stainless washers.

This completes the structural and exterior enclosure of the building/house.

3. LIST OF COMPONENTS

4.1 Introduction

MSA-ONE system is designed for a near zero (or extremely low) maintenance free life, requiring no paint, glue, liquid sealants or other short-life products and finishes.

MSA-ONE systems are constructed using Environmentally Sustainable and Maintenance-Free materials, such as:

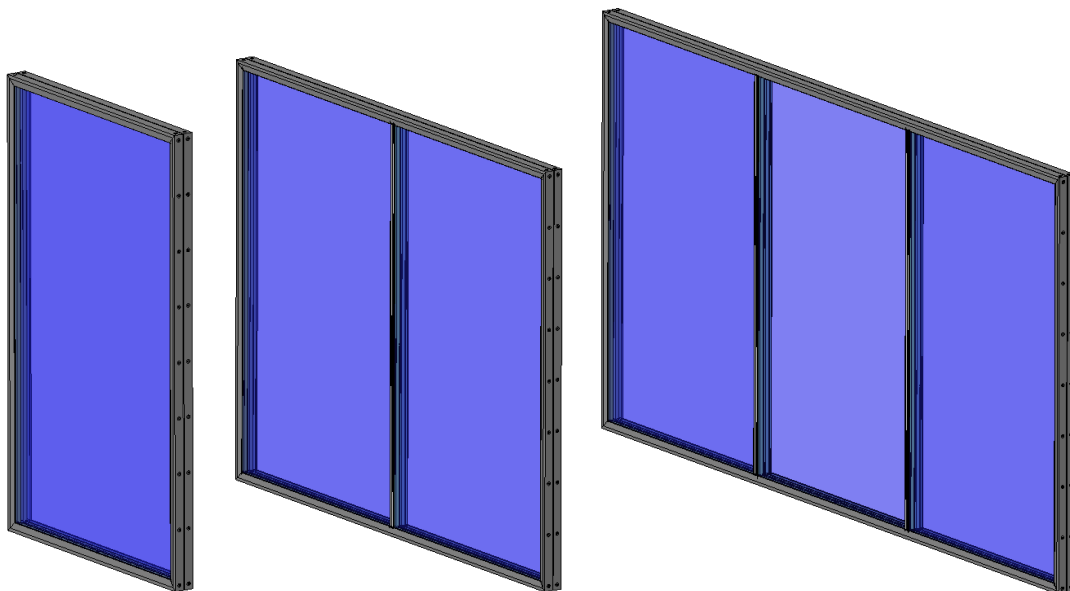
- Marine Grade (316) Stainless Steel Frames and Machine Screws
- Toughened and Ground 8mm Float Glass
- Extruded Silicon Rubber Static and Dynamic Seals
- Moulded Silicon Rubber Corner Blocks

Delivered Component List

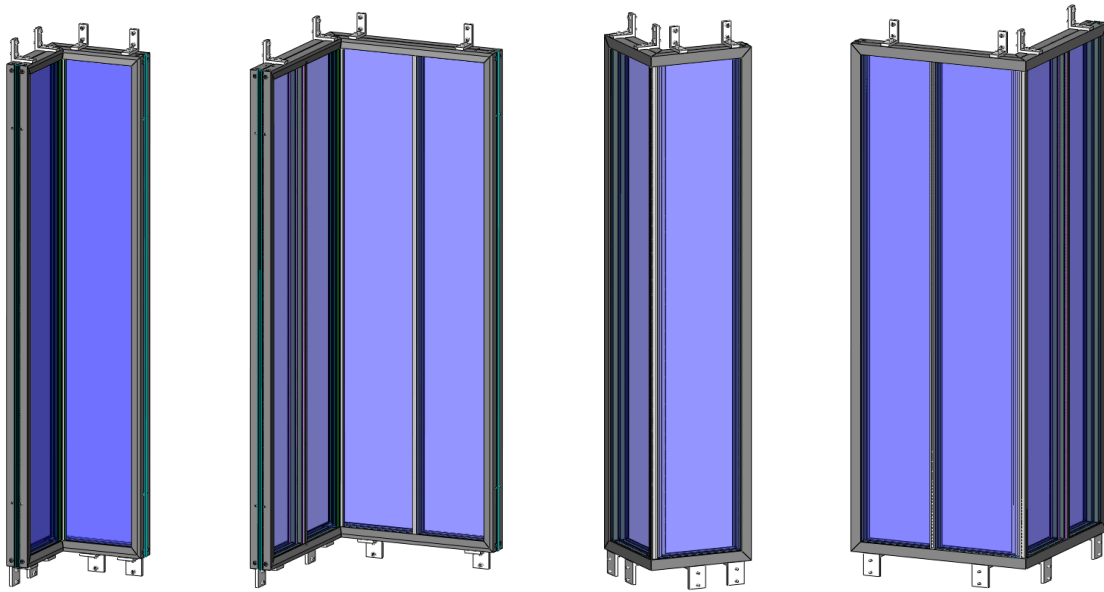
1. Straight Wall Panel Assembly (single and multiple panels)
2. Corner Wall Panel Assembly (90-degree return, internal & external single & multiple panels)
3. Door/Window Assembly (Door and Window are of the same construction)
4. Window Assembly (Supplied with Wall Panels Top and Bottom to suit the stud required)
5. Full Window Assembly (Supplied with Bottom Wall Panels to suit the stud required)

IMAGES

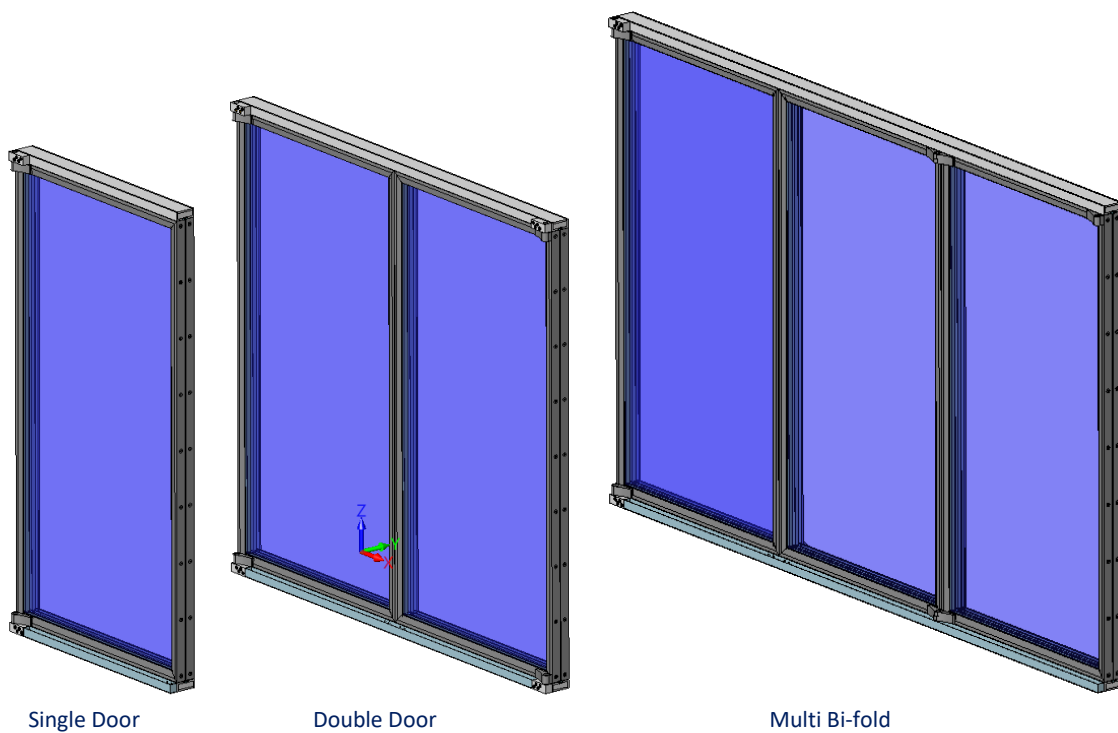
1. Straight Wall Panel Assembly (single and multiple panels)



2. Corner Wall Panel Assembly: 90-degree return, internal & external single & multiple panels



3. Door/Window Assembly (door and window are of the same construction)

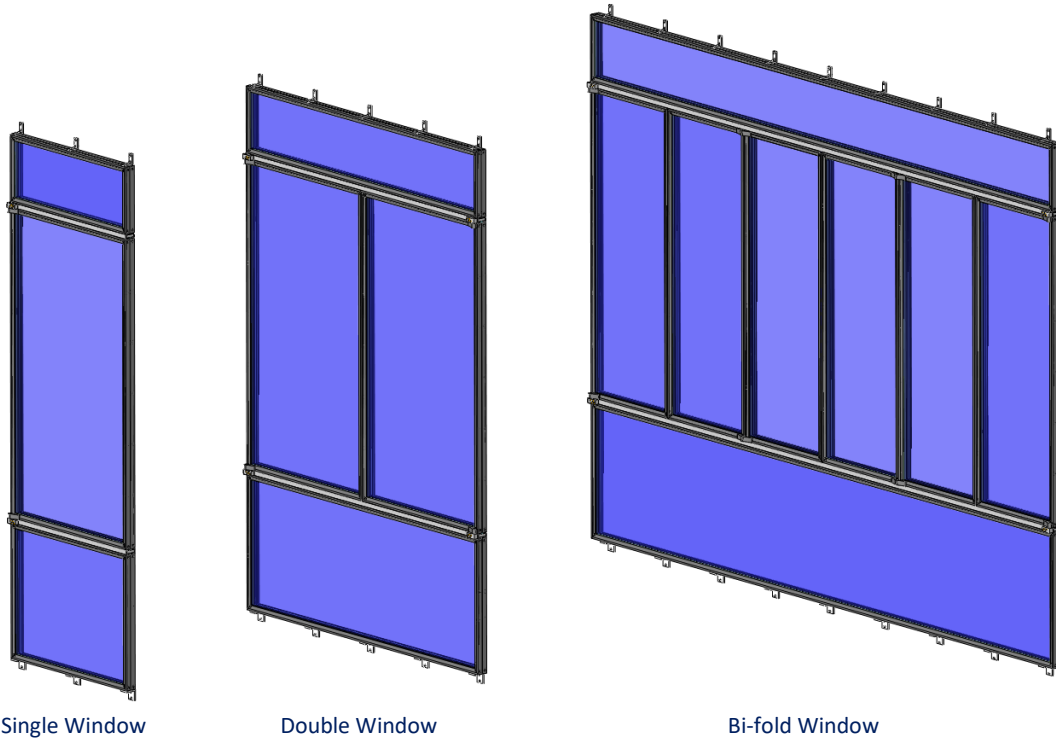


Single Door

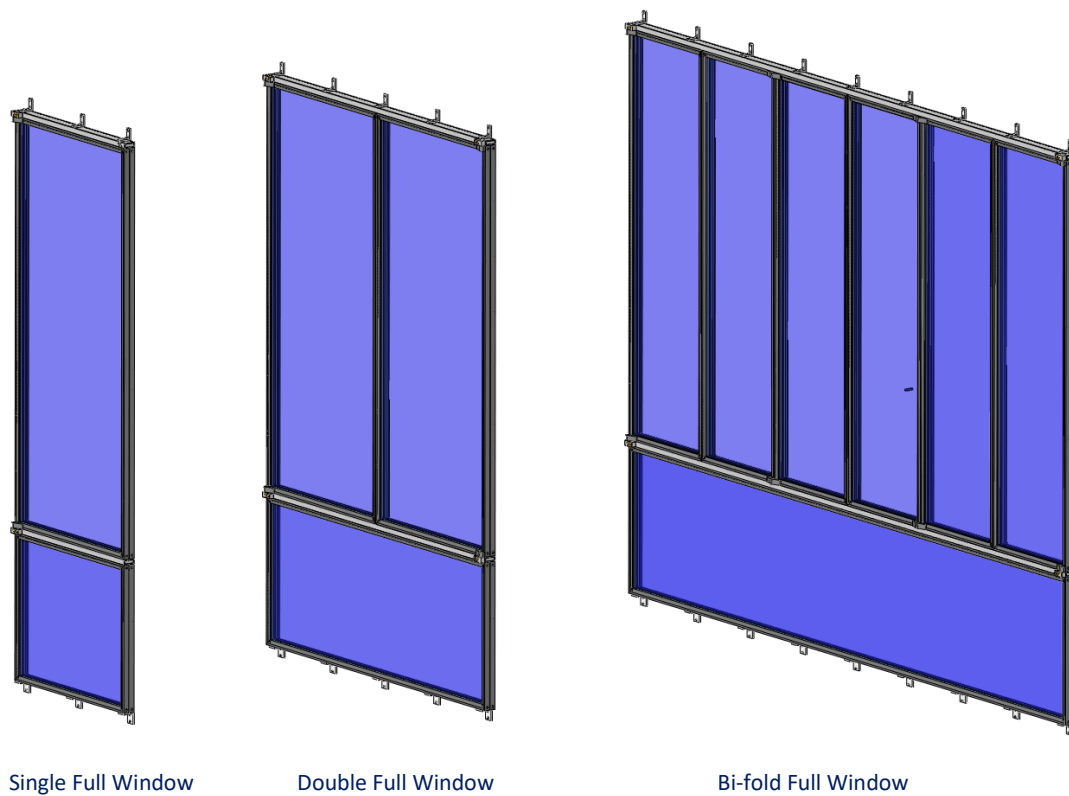
Double Door

Multi Bi-fold

4. Window Assembly (Supplied with Wall Panels Top and Bottom to suit the stud required)



5. Full Window Assembly (Supplied with Bottom Wall Panels to suit the stud required)



4. HEALTH AND SAFETY

The following Health and Safety Requirements are to be maintained at all times:

- An approved First Aid Kit/Box must be maintained and readily available
- Safety glasses and approved vests must be worn by all personnel that enter the work site/area or beyond safety barriers. Helmets, Safety Shoes and Ear Protection must be worn in work areas that require such safety precautions (these areas shall be signed as such). All visitors shall remain behind safety barriers or within the safety zones marked unless authorised to enter such work-zones
- Always wear steel capped work shoes or boots, an approved safety vest or jacket and a safety helmet when working on building assembly and installation and when working with or around machinery.
- Always wear eye and ear protection when working with or around machinery.
- An approved safety harness and lanyard must be used when working at heights above 3M where safety barriers have not been installed.
- All hazards and potentially hazardous situations must be identified and protected against.
- Power tools must be used safely and in accordance with the manufacturer's instructions and safety guidelines. Use isolating transformers when working outdoors.
- Guards and protective barriers that are provided with any machinery must be maintained and kept in good working order and used as specified by the manufacturer.
- Never work alone when using any machinery or potentially dangerous equipment.
- Keep and maintain an accident log book. Report all serious accidents to management and take appropriate action to mitigate further injury or harm.

For site Assembly & Installation: It is recommended that workers have a current Site Safe passport

Note: Refer to Material Safety Data Sheet in Appendix 2

5. QUALITY ASSURANCE

MSANZ monitor and maintain records and reports of manufacture, distribution and the application of the MSA One Building Enclosure System in accordance with a Building Product Quality Plan (BPQP).

- Manufacturer's quality control check-list
- Records of batch numbers and manufacturing dates
- Records of batch number distribution
- Pre-check and job completion checklist.

6. MAINTENANCE AND WARRANTY

7.1 Maintenance

Ongoing maintenance is required every 5 years to inspect areas such as glass, argon gas levels (evidence of condensation), bolt and screw tightness, seals and weather-tightness etc. a maintenance checklist must be done by personnel trained and authorised by MSANZ Limited. Any failure of this WILL result in the warranty being invalidated.

7.2 Warranty**MSA-ONE WARRANTY**

1. MSANZ Limited (MSANZ) warrants MSA-ONE for a period of 10 years from the date of the completed installation [date to be inserted by authorised MSANZ installer/personnel] that:
 - a. The joinery used in the manufacture of the MSA-ONE System comprising Walls, Doors and Windows (The Product/s) are finished in accordance with NZBC performance standard for exterior architectural joinery and NZBC performance standards for exterior wall systems.
 - b. The Product/s comply with: NZBC Performance of Windows, and NZBC Code of Practice for Glazing in Buildings; and
 - c. As required under NZS 4211 the Product/s specified will remain watertight.
2. If the Product does not perform as warranted, MSANZ will make good the Product (at its option) by:
 - a. replacing or repairing the affected Product/s:
 1. supplying equivalent Product/s
 2. paying the cost of replacing the affected Product/s OR
 3. refunding the cost of the affected Product/s, subject to the following terms;
 - b. that MSANZ is advised of and given an opportunity to inspect any fault;
 - c. that any claims under this warranty need to be made in writing to MSANZ within 7 days of the fault first becoming apparent;
 - d. that this warranty is not transferable and only applies to the original purchaser, unless MSANZ agrees otherwise in writing;
 - e. that this warranty only applies:
 1. where the Product/s has been maintained in accordance with the maintenance procedure specified;
 2. to a defect in the workmanship or a defect that is directly attributable to a defect in the material of the Product/s; AND
 3. where the purchaser has paid in full for the supply (and installation) of the Product/s;
 - f. that the warranty does not apply to any:
 1. glass used in the Product/s;
 2. defects due to any cause beyond MSANZ's control including, without limitation, defects in the structure to which the joinery has been affixed;
 3. materials, hardware or componentry not manufactured by MSANZ; AND
 4. weathertightness - where the contract is one of manufacture and supply only, the junction between the MSA-ONE Product/s (joinery) and any cladding systems other than MSANZ, is the responsibility of the builder;
 - g. that MSANZ will not be liable for any consequential, indirect or special damage or loss including, without limitation, any loss of profits;
 - h. that the warranty does not apply to any fault caused by incorrect installation by anyone other than MSANZ or its authorised agents, and/or any installation otherwise than in accordance with the installation guide current at the time of supply.
3. This warranty is given by MSANZ Limited, also trading as MSA and MSA-ONE.

Authorised Person/Installer _____

Signed _____ Date _____

7. CHECKS (CHECK LISTS)

For compliance purposes and to protect the validity of any Warrantee, MSANZ must receive the completed and signed quality assurance and checklist/s appropriate to the assembly and/or installation of any MSA-ONE system/s. Failure to complete this check by an authorised installer WILL void the warranty.

ON SITE and OFF SITE CHECKLIST for MSANZ INSTALLERS**v1.2**

DATE: _____

CONSENT # _____ (If known)

OWNER/APPLICANT: _____

ARCHITECT/DESIGNER/ENGINEER: _____ + _____

CONSENT ADDRESS: _____

NAME OF BUILDER/FRAMING SUPPLIER (if Applicable): _____

- | | | |
|----|---|----------|
| 1. | Is the frame supplied a specific design* | YES / NO |
| 2. | Framing installed as per consented drawings and specification | YES / NO |
| 3. | All Alignments completed as per product specification | YES / NO |

* Specific Design means a design scope of use outside this technical manual

SIGNATURE OF BUILDER/FRAMING SUPPLIER: _____

NAME OF PRODUCT INSTALLER: _____

- | | | |
|----|---|----------|
| 4. | All Wall Sections installed as per MSANZ Technical Manual | YES / NO |
| 5. | All Doors/Windows installed as per MSANZ Technical Manual | YES / NO |
| 6. | All Wall alignment completed as per MSANZ Technical Manual | YES / NO |
| 7. | All Doors/Windows alignment completed as per MSANZ Technical Manual | YES / NO |
| 8. | All Seals installed and checked as per MSANZ Technical Manual | YES / NO |
| 9. | All Screws locked as per MSANZ Technical Manual | YES / NO |

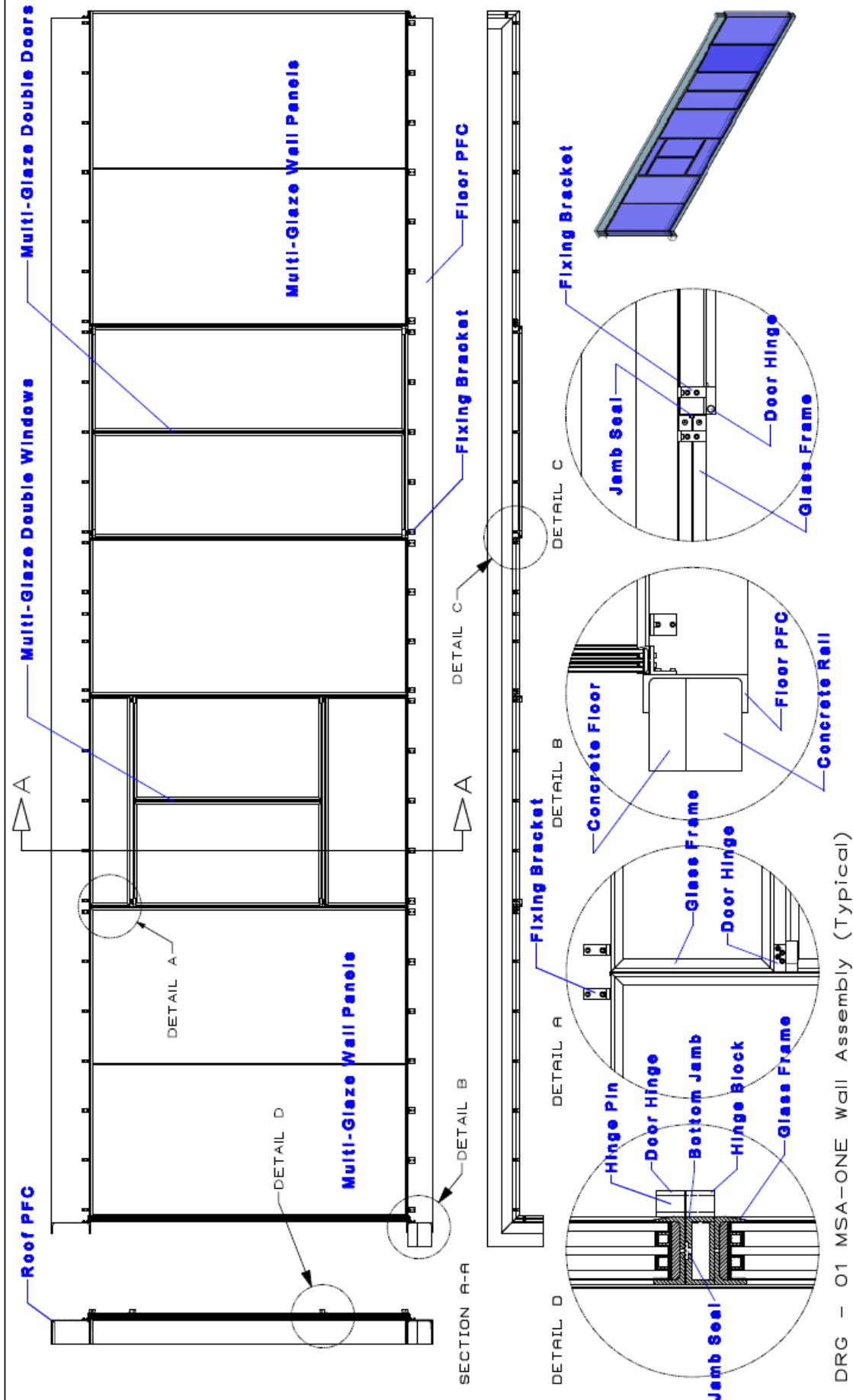
SIGNATURE AND TITLE OF SUPERVISOR/PRODUCT INSTALLER: _____

COMMENTS: _____

Appendix 1

Drawings List

DWG 1	MSA ONE – WALL ASSEMBLE (TYPICAL)
DWG 2	MSA ONE – WALL SYSTEM (TYPICAL)
DWG 3	MSA ONE – WALL SYSTEM (SET-IN)
DWG 4	MSA ONE – WALL AND CORNER DETAIL
DWG 5	MSA ONE – ALT WALL AND CORNER DETAIL
DWG 6	MSA ONE – VERTICAL WEATHER SHIELD
DWG 7	MSA ONE – WEATHER SHIELD BETWEEN FLOORS
DWG 8	MSA ONE – SOFFIT PARAPET GUTTERS (TYPICAL)
DWG 9	MSA ONE – WALL AND OVERHANG DETAIL
DWG 10	MSA ONE – WALL AND DECKING DETAIL
DWG 11	MSA ONE – SLIDING FRAME DETAIL
DWG 12	MSA ONE – DOUBLE DOOR ASSEMBLY (TYPICAL)
DWG 13	MSA ONE – DOUBLE WINDOW ASSEMBLY (TYPICAL)
DWG 14	MSA ONE – SINGLE DOOR ASSEMBLY (TYPICAL)
DWG 15	MSA ONE – SINGLE WINDOW ASSEMBLY (TYPICAL)
DWG 16	MSA ONE – BI-FOLD DOOR ASSEMBLY (TYPICAL)
DWG 17	MSA ONE – BI-FOLD WINDOW ASSEMBLY (TYPICAL)
DWG 18	MSA ONE – FULL SINGLE WINDOW ASSEMBLY (TYPICAL)
DWG 19	MSA ONE – FULL DOUBLE WINDOW ASSEMBLY (TYPICAL)
DWG 20	MSA ONE – FULL BI-FOLD WINDOW ASSEMBLY (TYPICAL)
DWG 21	MSA ONE – WALL TO FRAME ASSEMBLY
DWG 22	MSA ONE – FIXING BRACKET



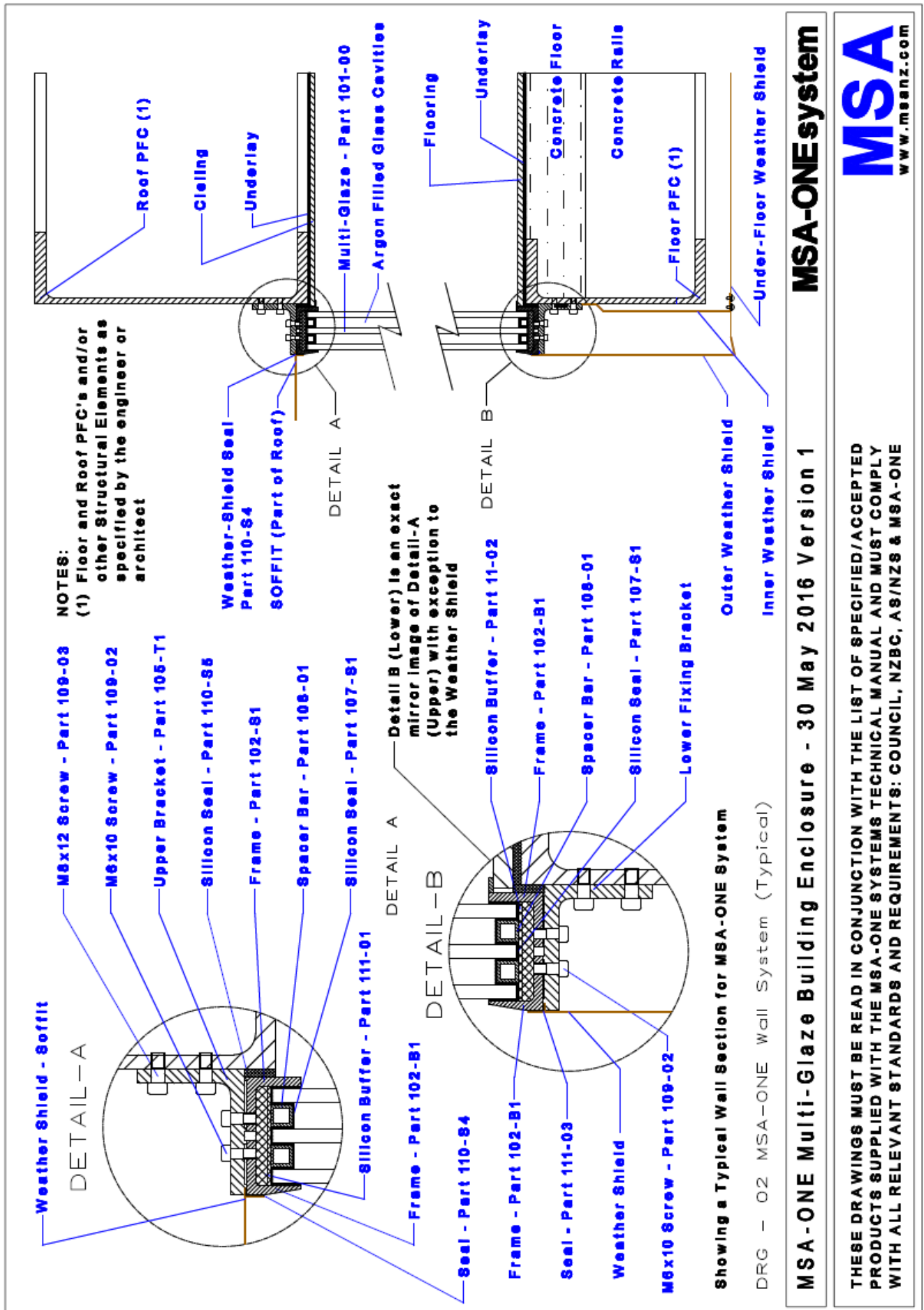
DRG - 01 MSA-ONE Wall Assembly (Typical)

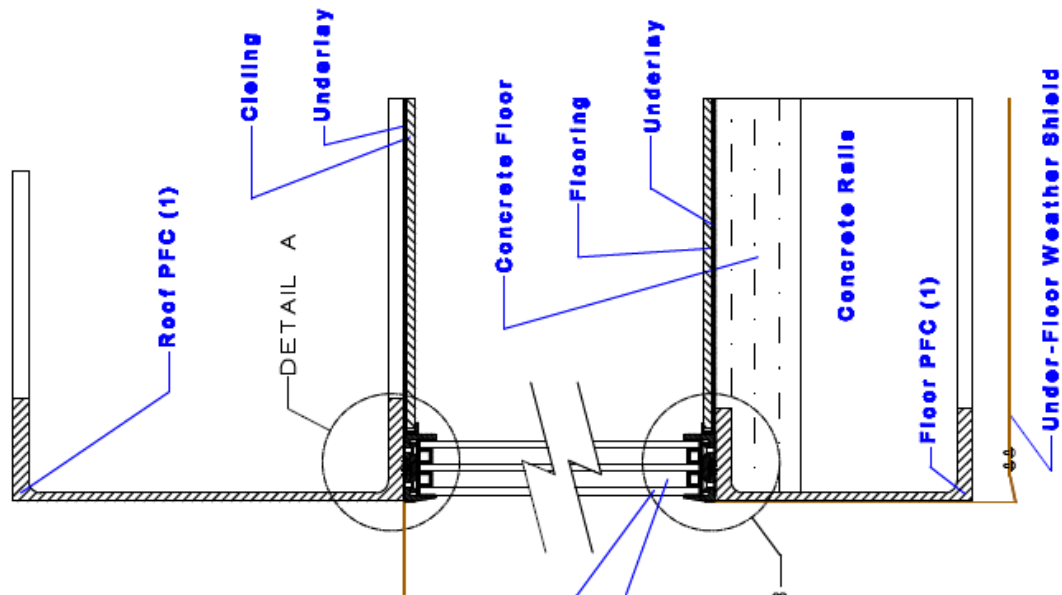
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DETAIL A

- M6x10 Screw - Part 109-01
- Weather Shield
- Seal - Part 110-S4
- Frame - Part 101-B1
- Silicon Seal - Part 111-02
- Silicon Seal - Part 110-D1
- Silicon Seal - Part 111-02
- Inner Bracket - Part 108-81
- Angle Bracket - Part 201-50
- Frame - Part 101-81
- Spacer Bar - Part 108-01
- Silicon Seal - Part 110-81

DETAIL B

Detail B (Lower) is an exact mirror image of Detail-A (Upper) with exception to the Weather Shield

WeatherShield Seal Part 110-S4

Weather Shield

Showing a Typical Wall Section for MSA-ONE System

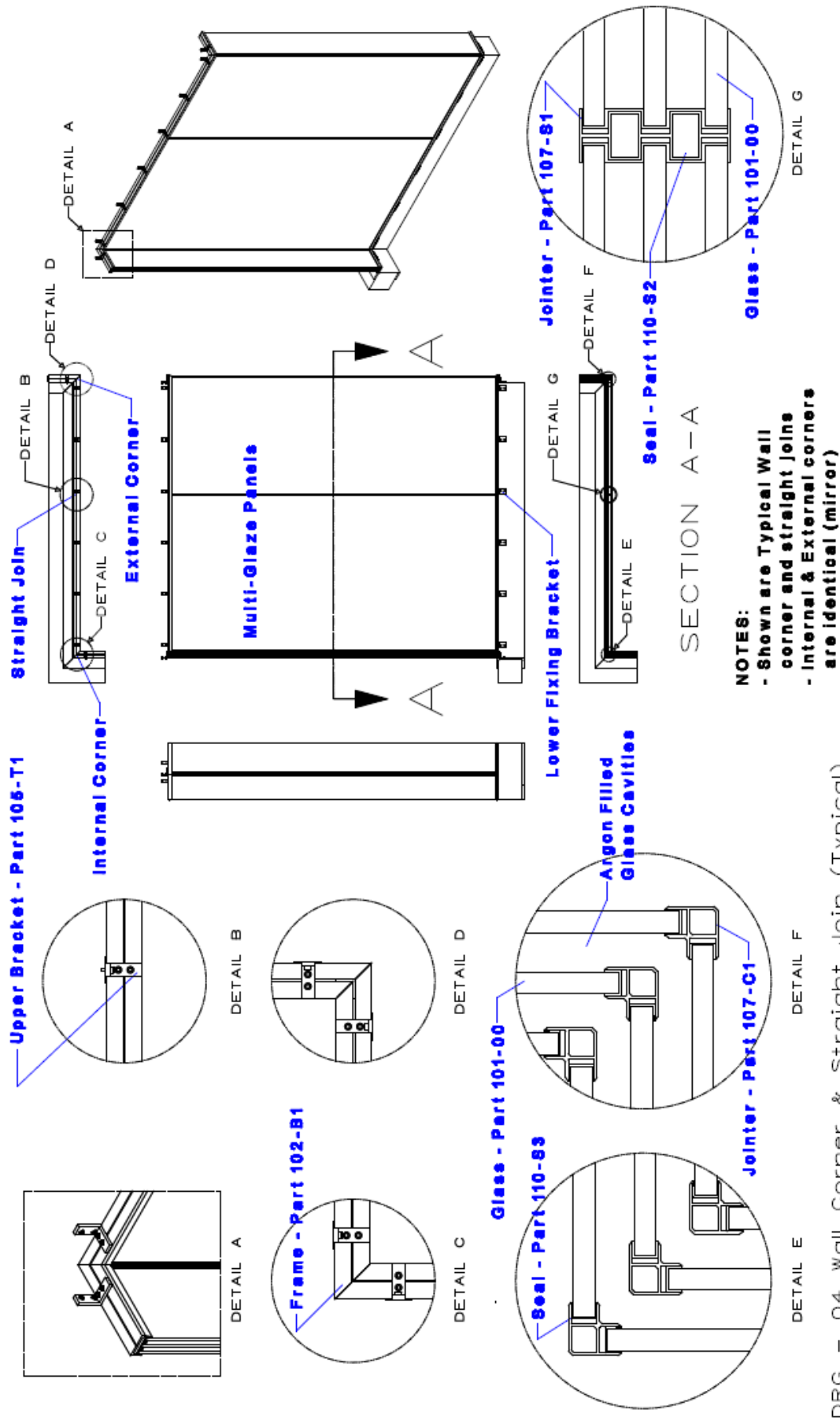
DRG - 03 MSA-ONE Wall System (Set-In)

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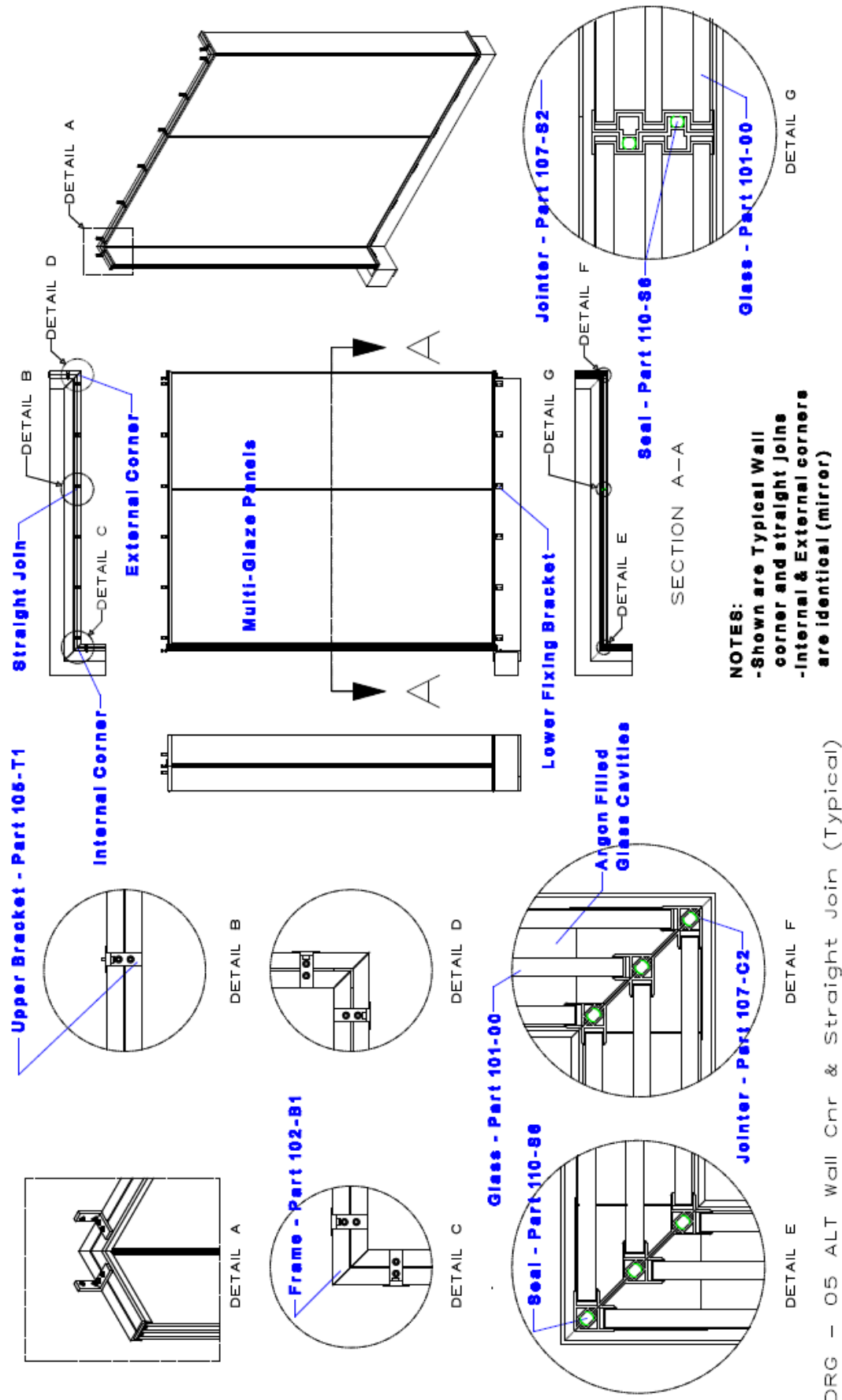


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DRG - 05 ALT Wall Cnr & Straight Join (Typical)

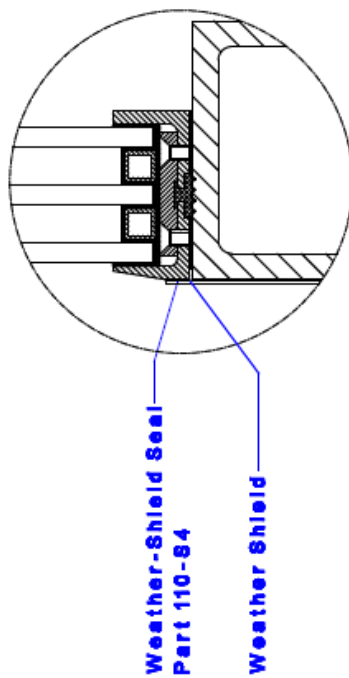
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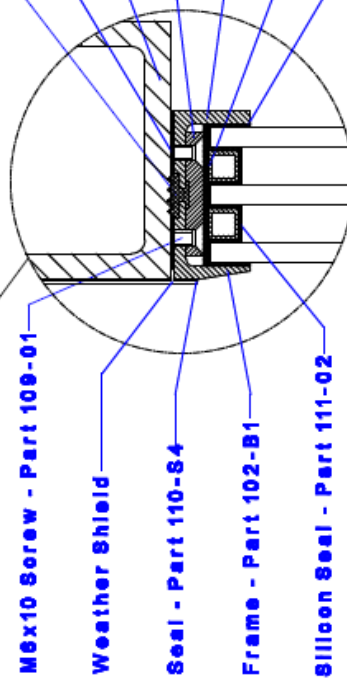
HORIZONTAL CROSS - SECTION OF VERTICAL WEATHER SHIELD

DETAIL A



Detail B is a mirror
image of Detail-A

DETAIL B



Multi-Glaze - Part 101-00

Argon Filled Glass Cavities

Support Pillar SHS (1)

Weather Shield

Silicon Seal - Part 110-D1

Silicon Seal - Part 111-02

Support Pillar (1)

Inner Bracket - Part 108-S1

Frame - Part 102-S1

Spacer Bar - Part 108-01

Silicon Seal - Part 110-S1

NOTES:
(1) Pillar (SHS) and/or any other
Structural Element as specified
by the engineer or architect

Shown is a Typical Vertical Weather Shield Assembly

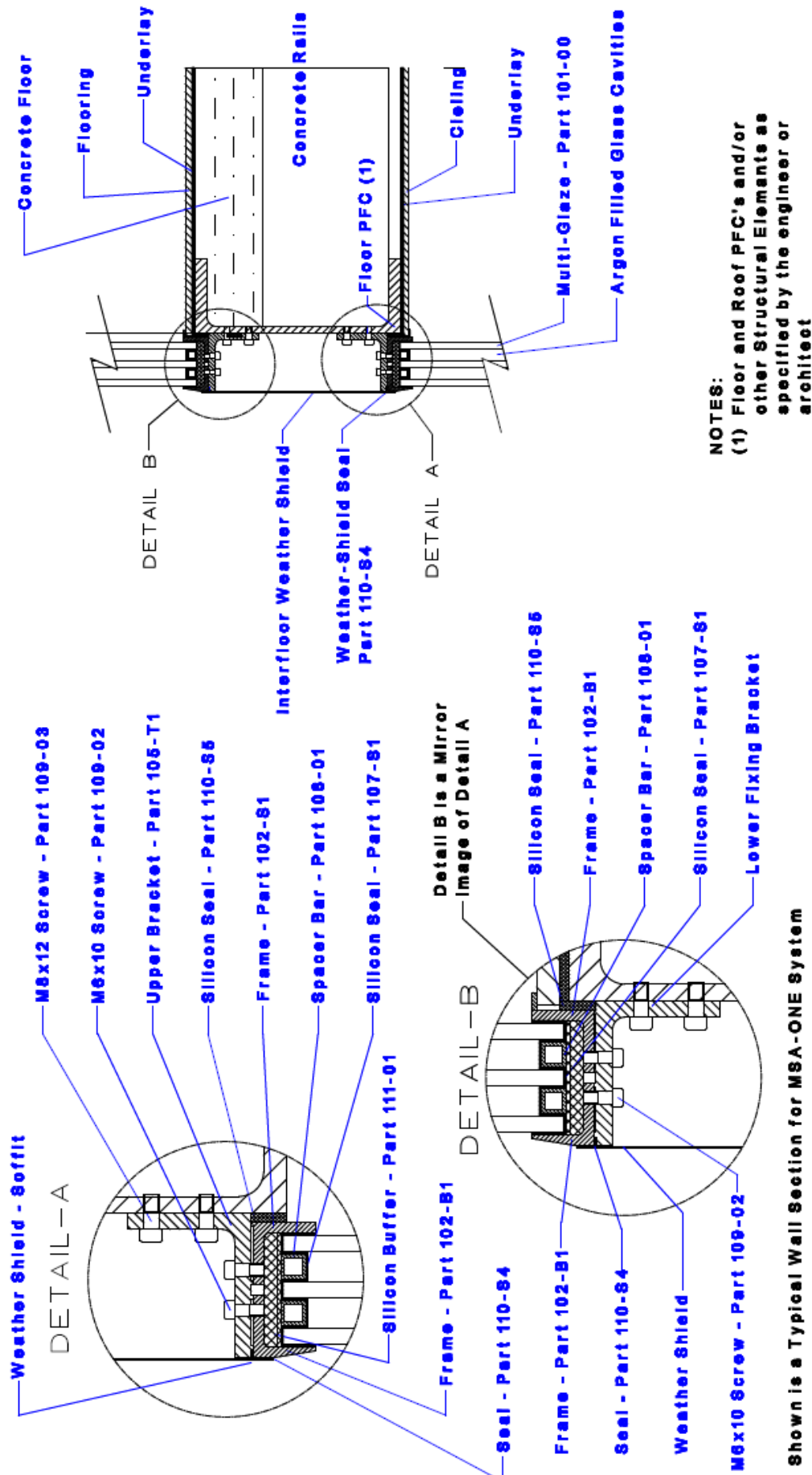
DRG - 06 Vertical Weather Shield Set-In (typical)

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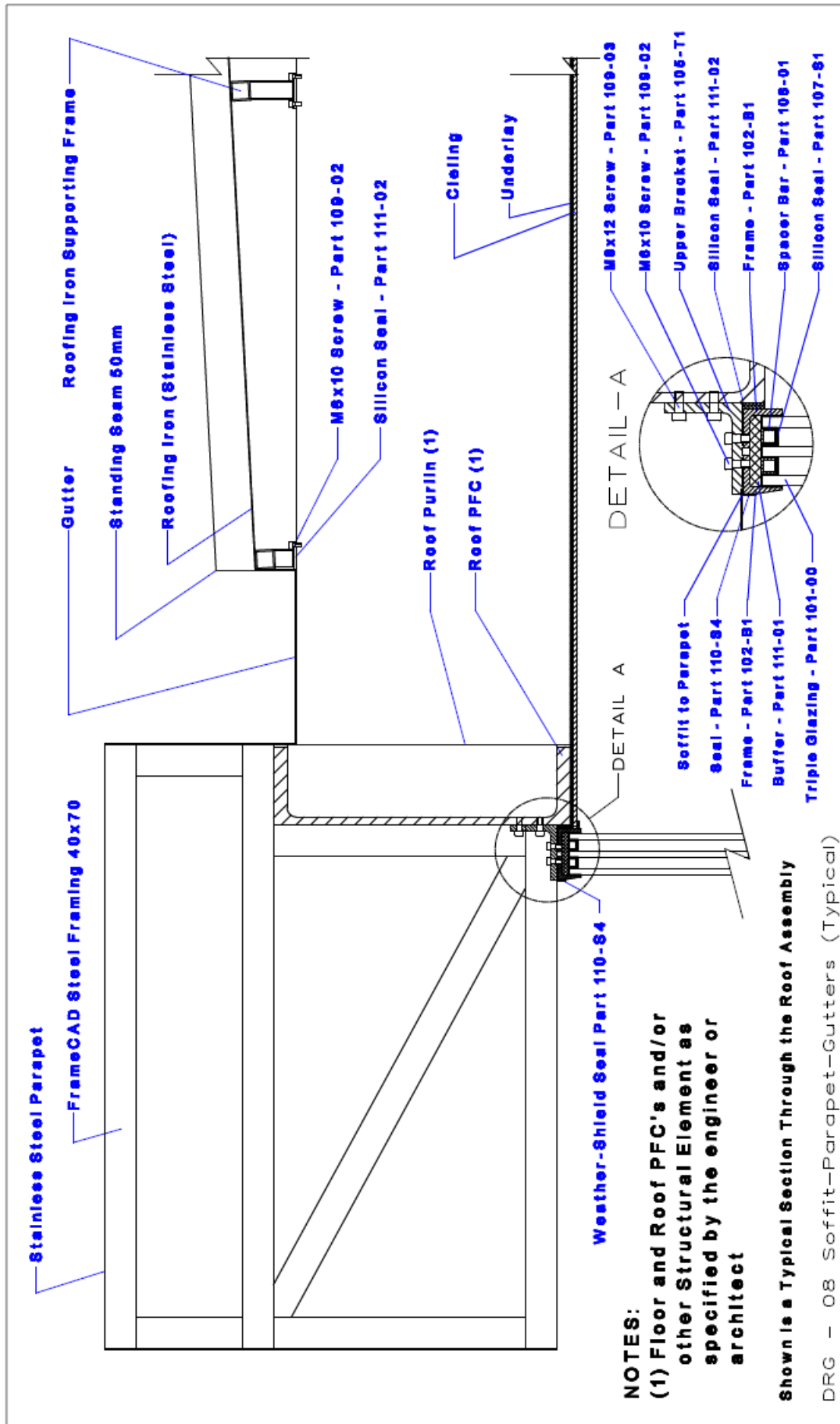
DRG - 07 MSA-ONE Weather Shield between Floors (Typical)

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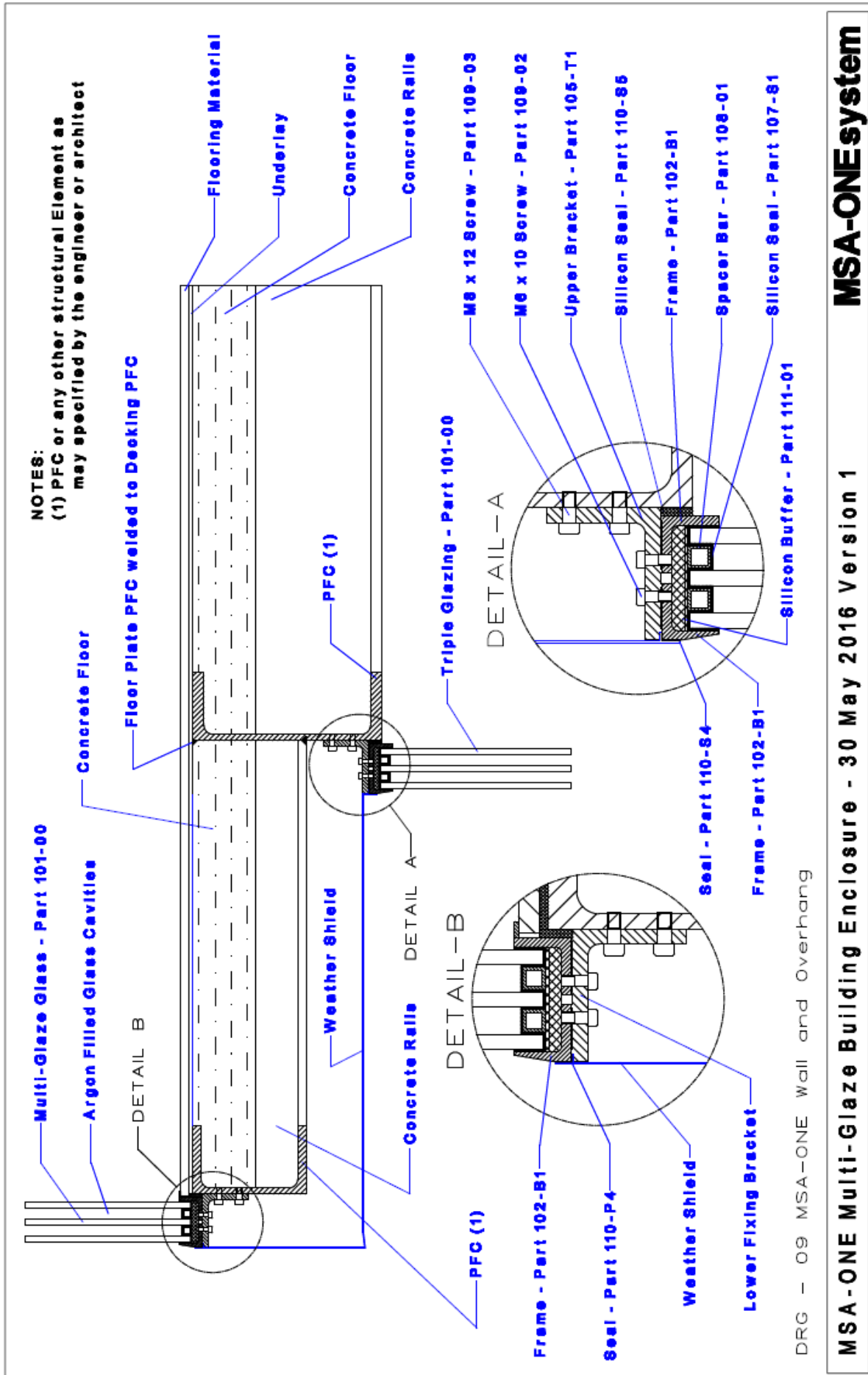


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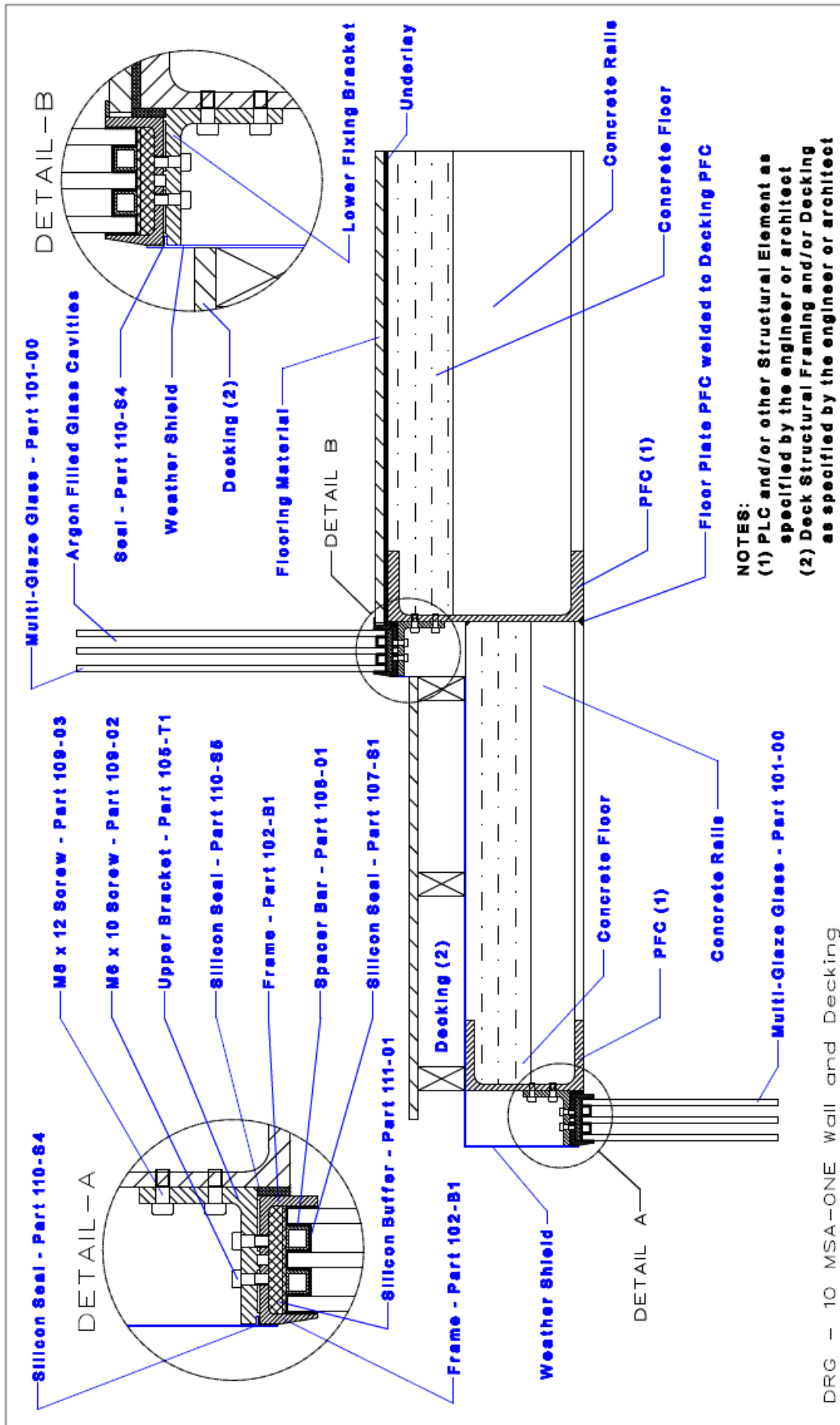
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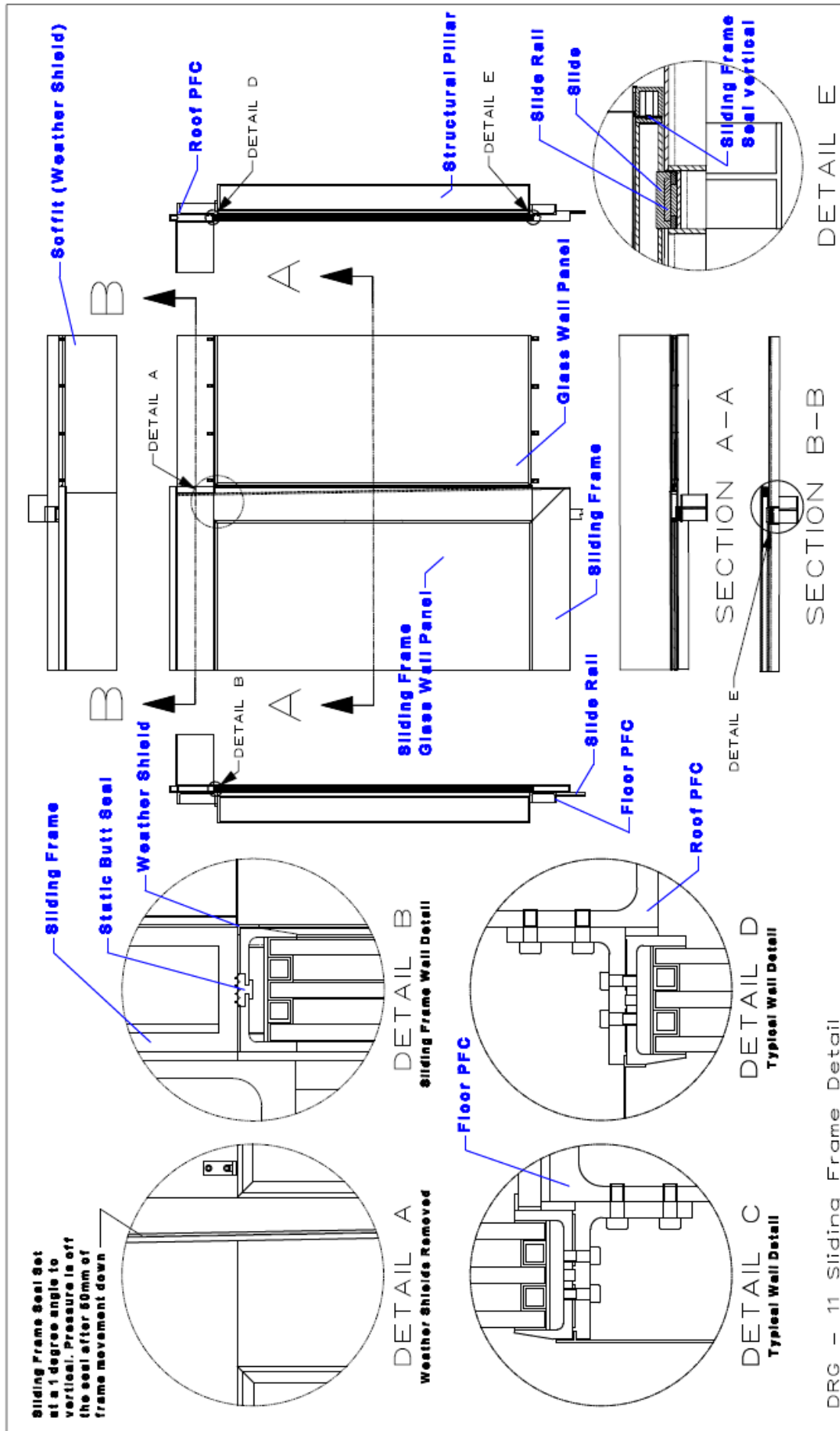


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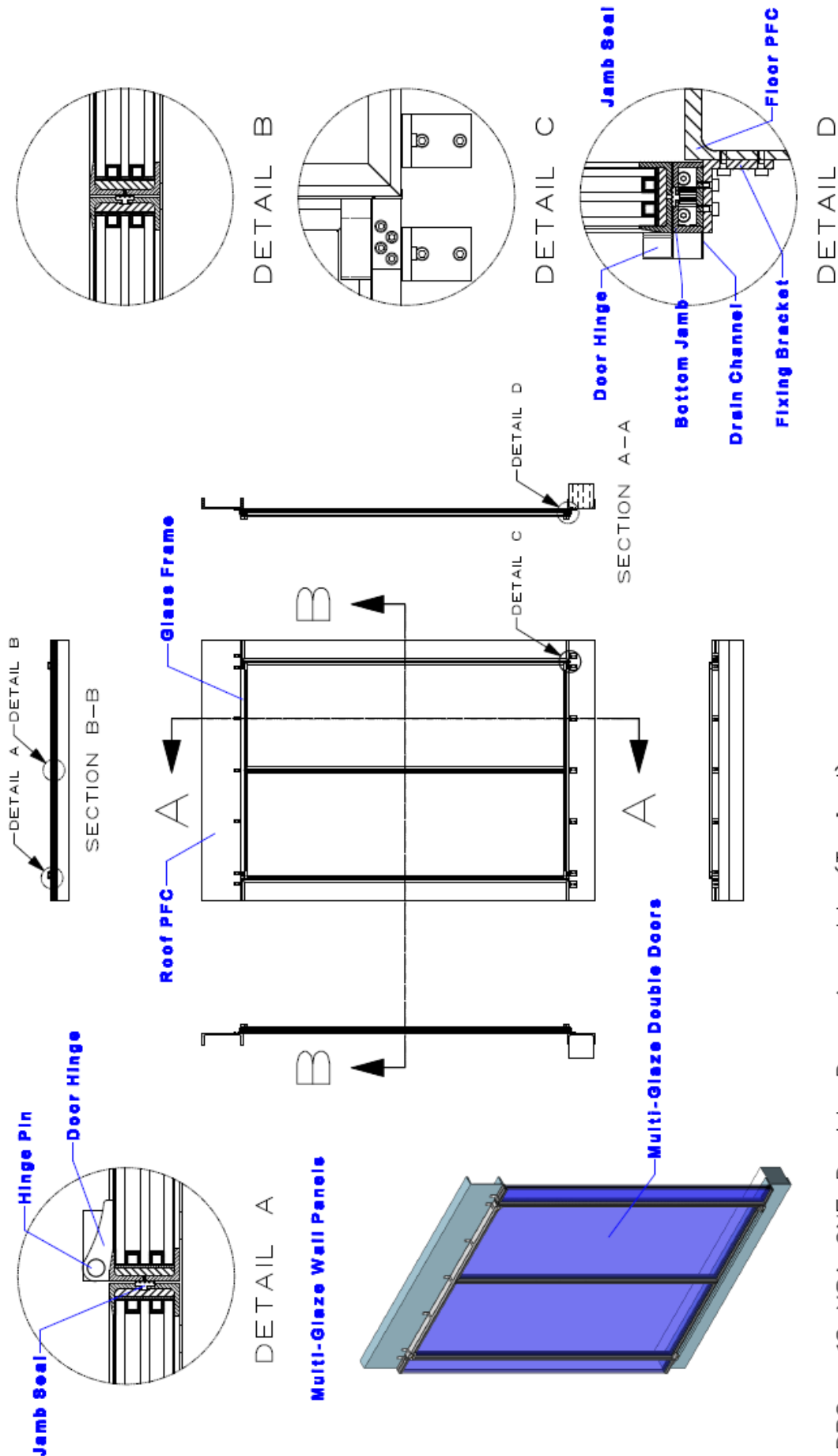


DRG - 11 Sliding Frame Detail

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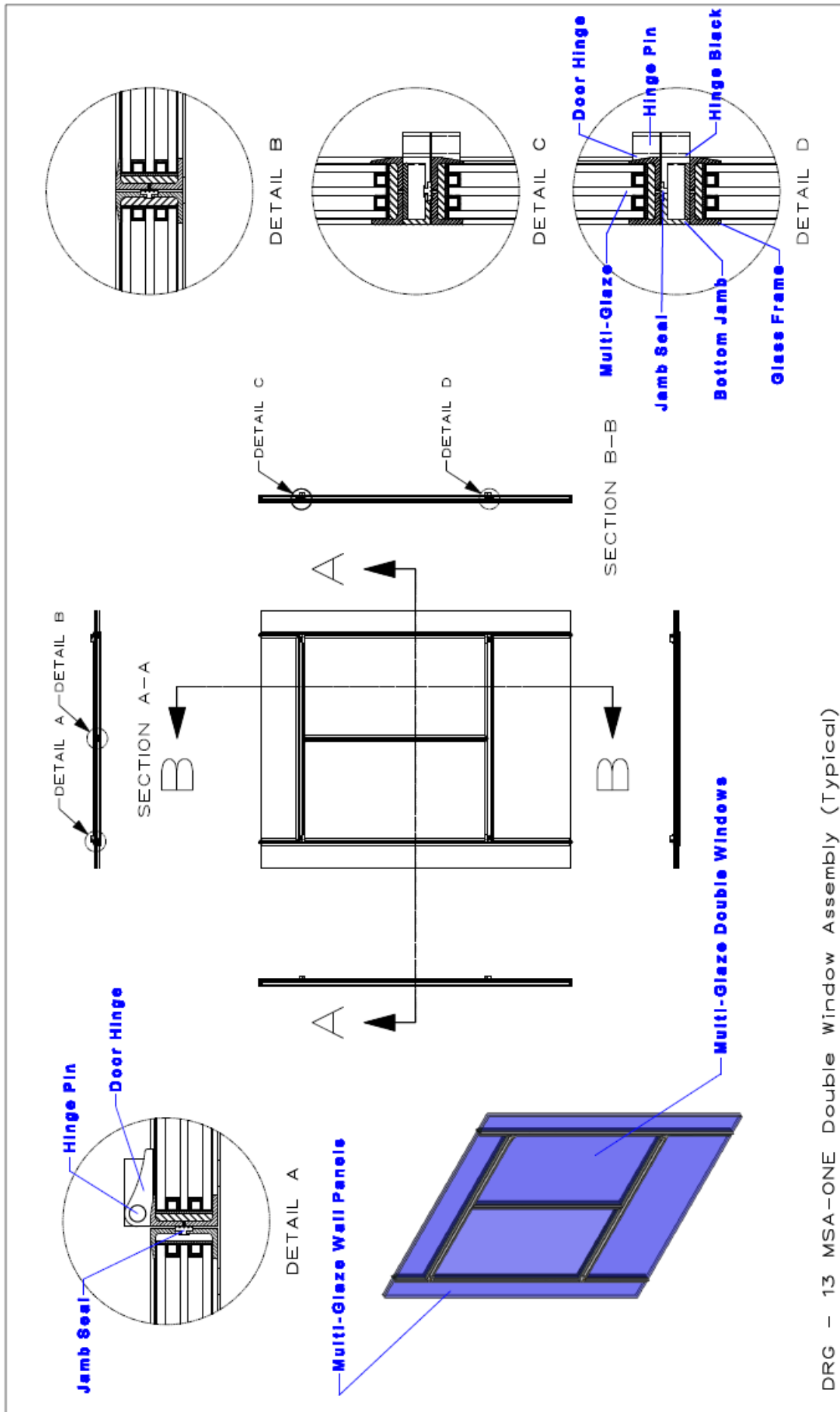
DRG - 12 MSA-ONE Double Door Assembly (Typical)

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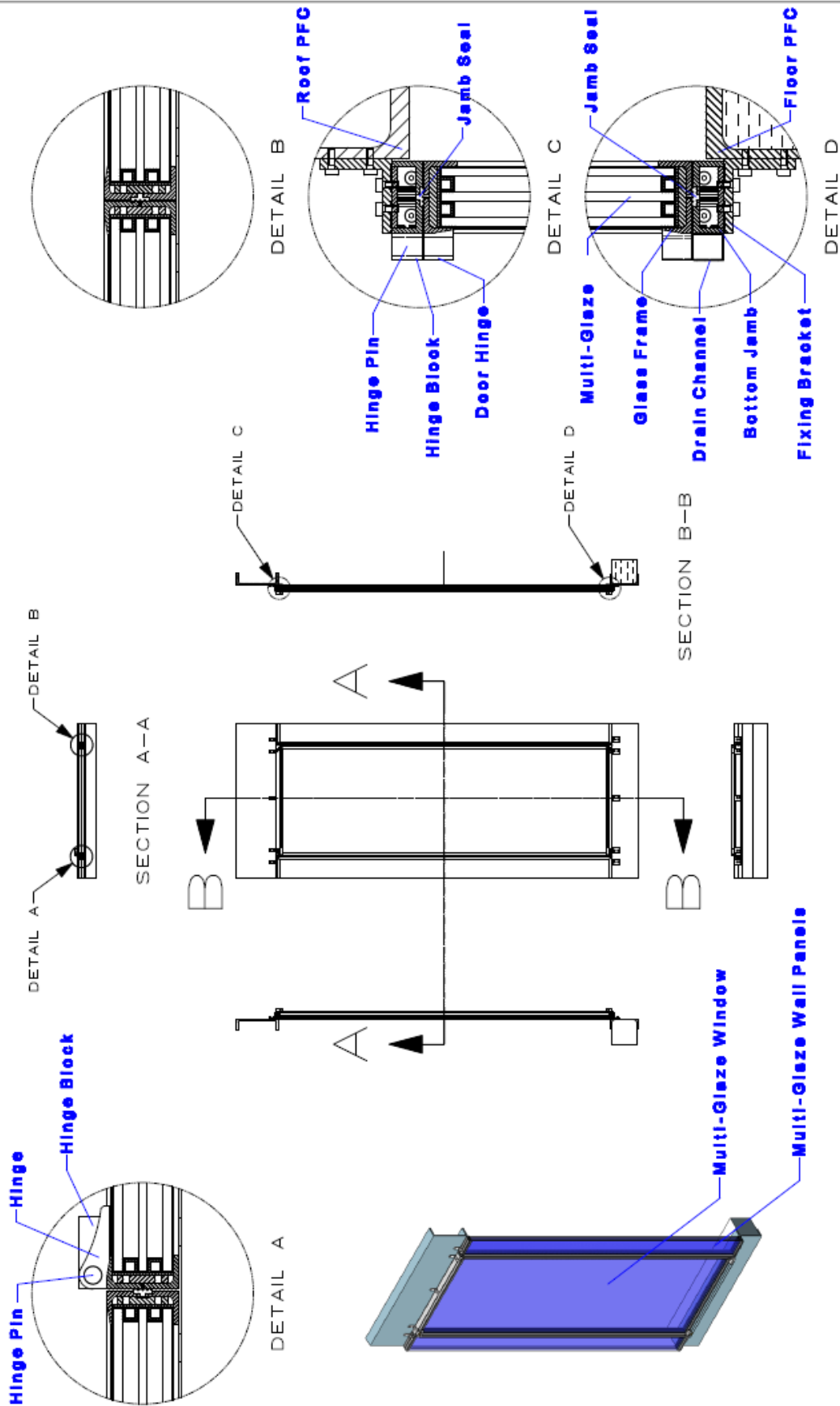
DRG - 13 MSA-ONE Double Window Assembly (Typical)

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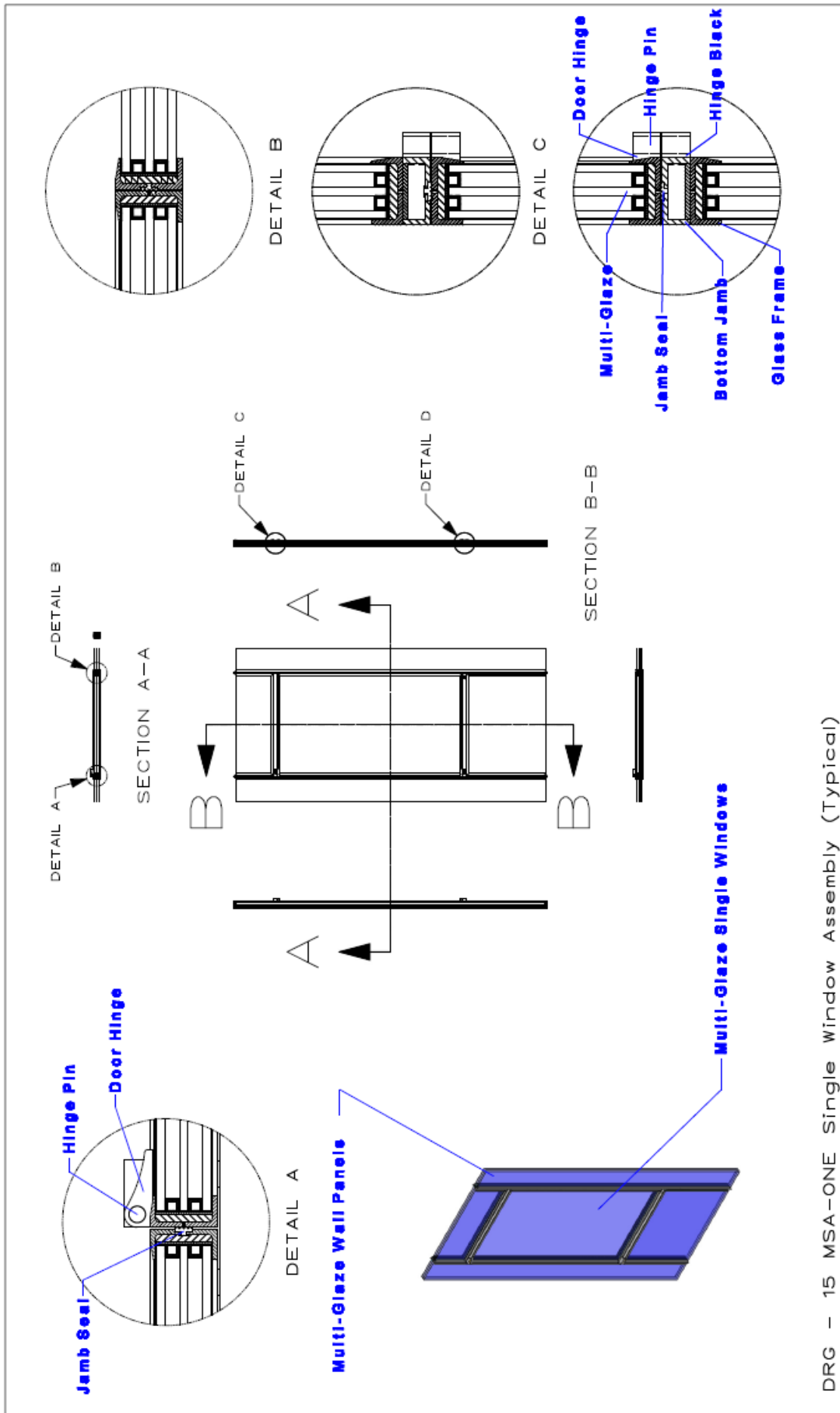
DRG - 14 MSA-ONE Single Door Assembly (Typical)

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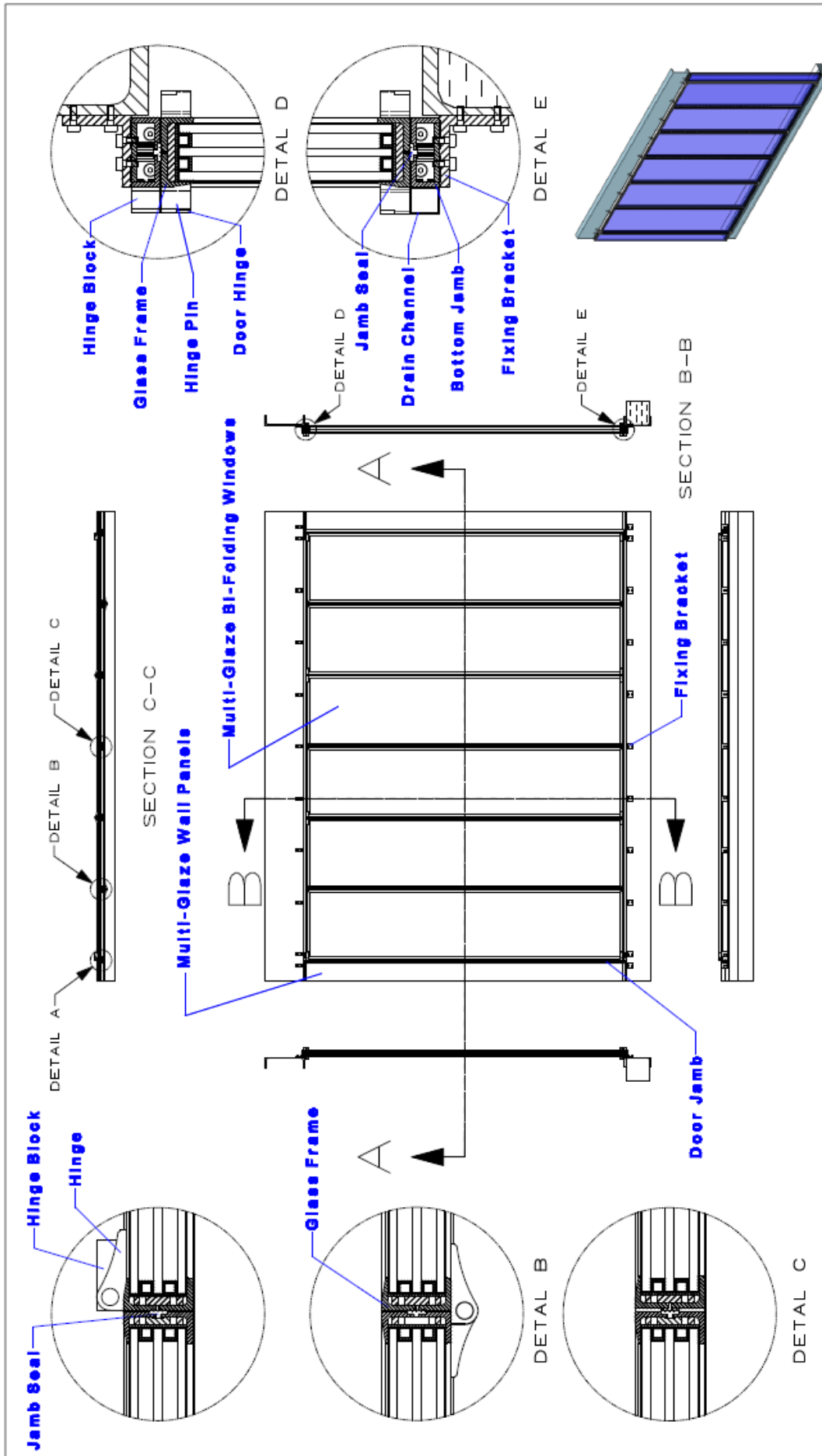
DRG - 15 MSA-ONE Single Window Assembly (Typical)

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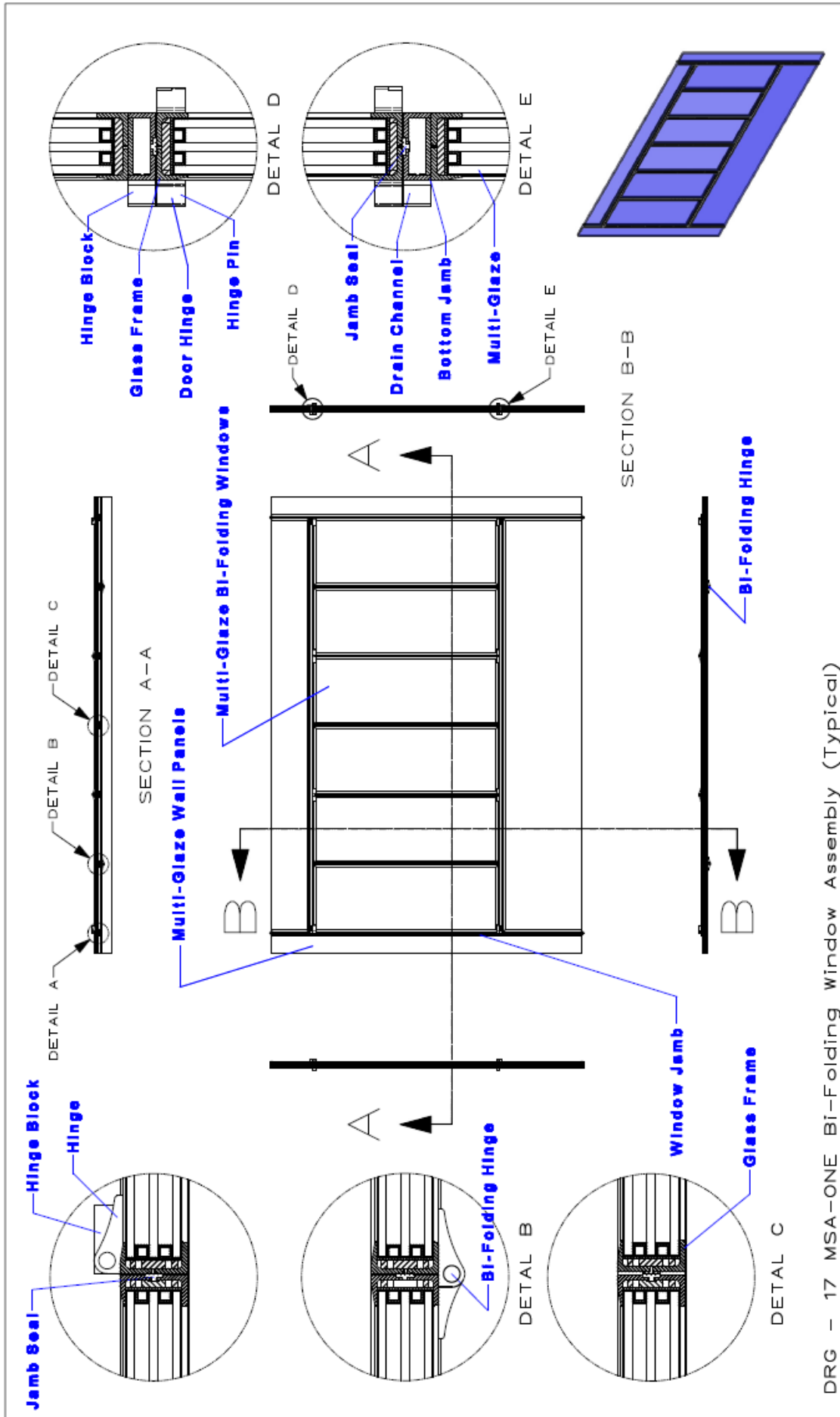
DRG - 16 MSA-ONE Bi-Folding Door Assembly (Typical)

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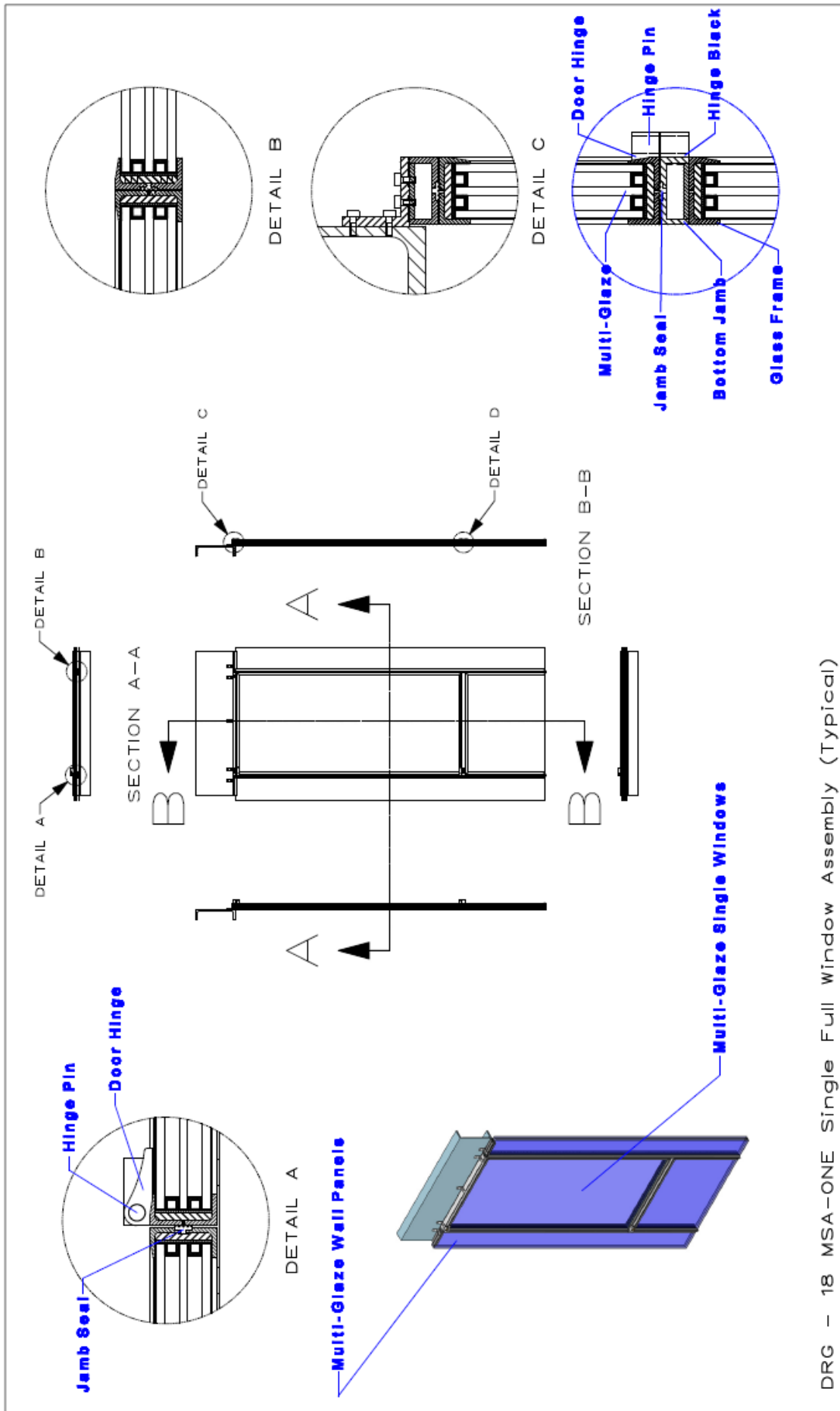
DRG - 17 MSA-ONE Bi-Folding Window Assembly (Typical)

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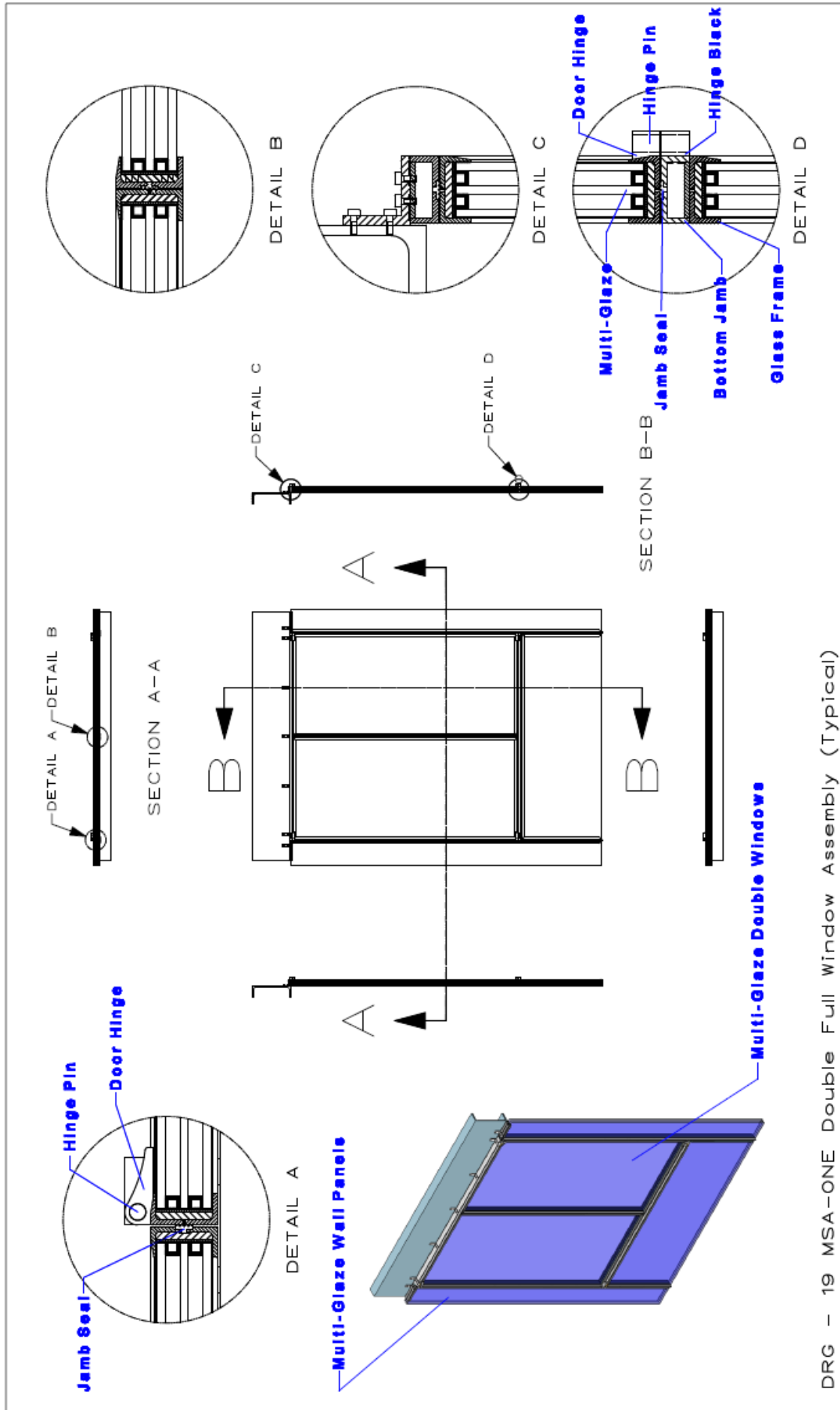
DRG - 18 MSA-ONE Single Full Window Assembly (Typical)

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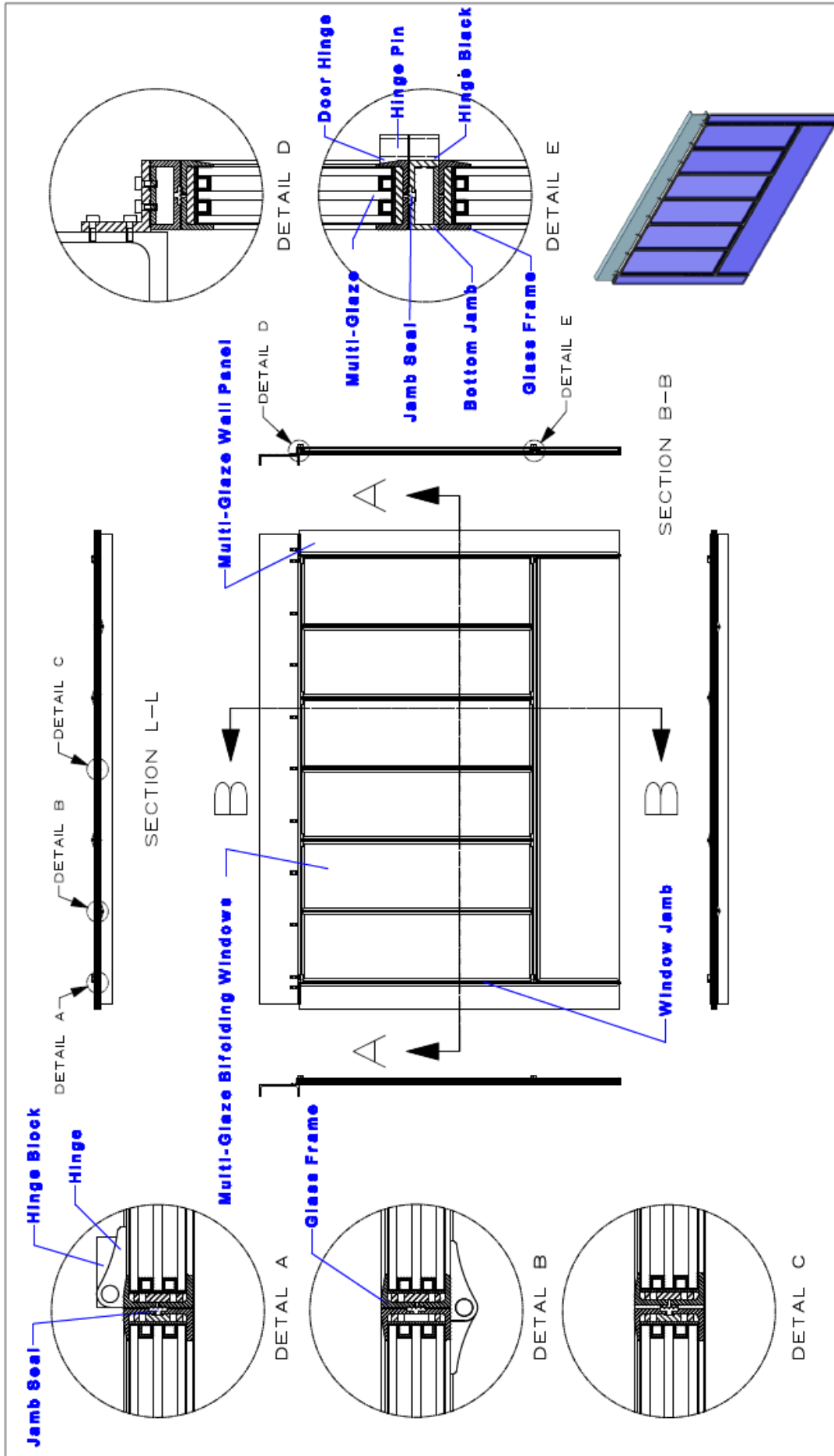
DRG - 19 MSA-ONE Double Full Window Assembly (Typical)

MSA-ONEsystem

MSA-ONE Multi-Glaze Building Enclosure - 30 May 2016 Version 1

THESE DRAWINGS MUST BE READ IN CONJUNCTION WITH THE LIST OF SPECIFIED/ACCEPTED PRODUCTS SUPPLIED WITH THE MSA-ONE SYSTEMS TECHNICAL MANUAL AND MUST COMPLY WITH ALL RELEVANT STANDARDS AND REQUIREMENTS: COUNCIL, NZBC, AS/NZS & MSA-ONE

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DRG - 20 MSA-ONE Bifold Full Window Assembly (Typical)

MSA-ONE Multi-Glaze Building Enclosure - 30 May 2016 Version 1

MSA-ONEsystem

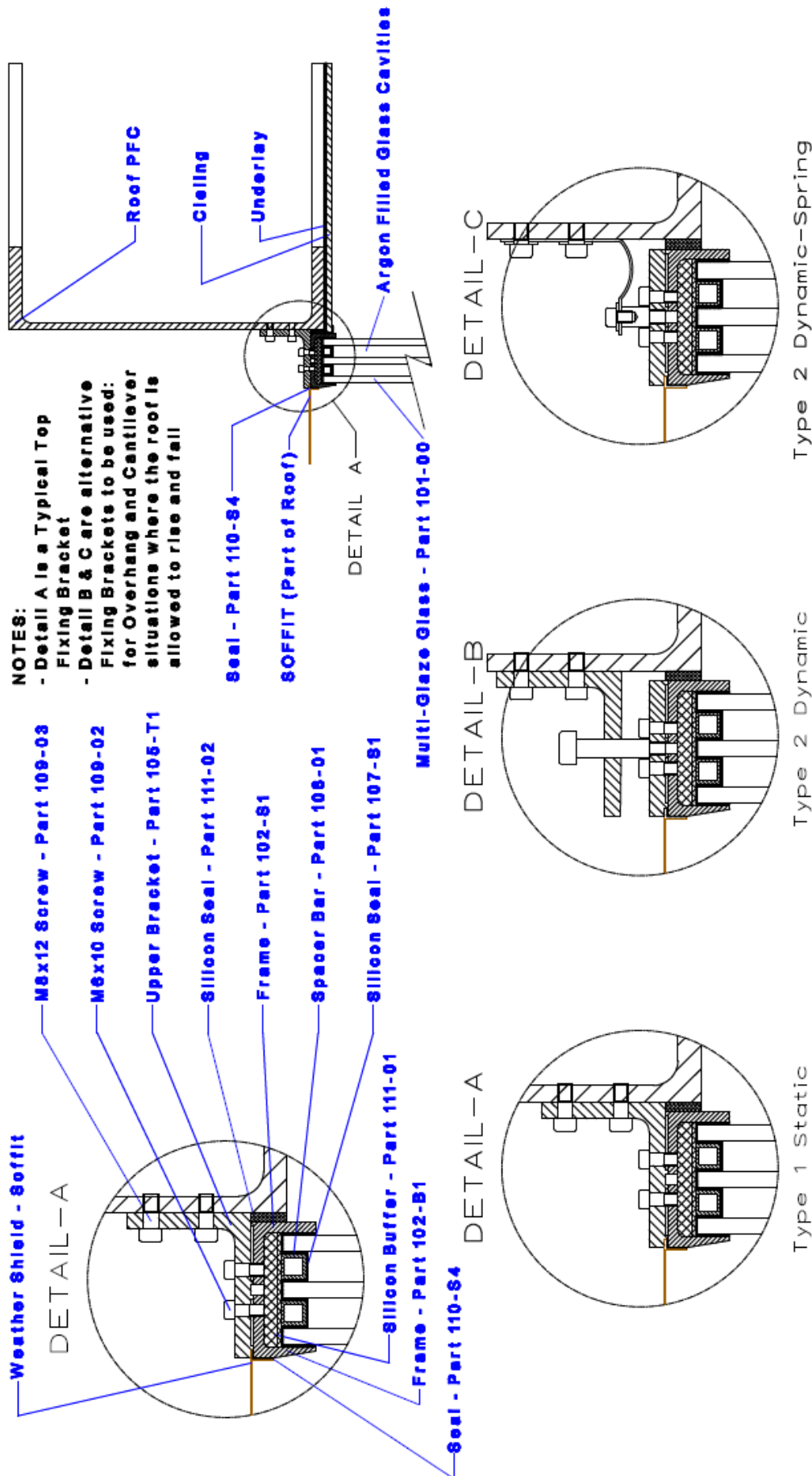
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DRG - 22 MSA-ONE Fixing Brackets

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Appendix 2

MATERIALS SAFETY DATA SHEET: MSA-ONE SYSTEM

(1.0) IDENTIFICATION OF THE PRODUCT AND COMPANY

1.1	Product Name	MSA - ONE SYSTEM
1.2	Product Type	Complete exterior house weather-tight envelope including Triple Glazed Walls, Doors and Windows
1.3	Chemical Classification	Not Applicable as assembled product (ref components and resulting constituent ingredient below)
1.4	Dangerous Goods Classification	Not Applicable as assembled product (ref components and resulting constituent ingredient below)
1.5	Company Details	MSANZ Limited, 583 Woodcocks Road, Warkworth AUCKLAND NZ (tel) 0274 304080 (w) www.msanz.com

(2.0) HAZARDS IDENTIFIED AND TREATMENT

PRODUCT		HAZARD CLASSIFICATION	HAZARD	FIRST AID TREATMENT
2.1	FULLY ASSEMBLED PRODUCT	Low Hazard		
		Crushing Injury	Product is Heavy and could cause injury due to crushing	Seek immediate medical attention
		Glass Breakage	See Glass and Argon Hazards below (Sections 2.3 & 2.8)	
	COMPONENT PARTS			
2.2	Stainless Steel Bars/Frames	Not Hazardous as supplied	Dust and fumes from subsequent processes can be Hazardous	If exposed seek medical advise
2.3	Toughened Glass Panes	Low Hazard		
		Crushing Injury	Product is Heavy and could cause injury due to crushing	Seek immediate medical attention
		Broken Glass	Possible Cuts/Lacerations	Treat with Antiseptic Cream and dress with Band-
		Dust	Fabrication operations (cutting, grinding, seaming, edging & breaking) may result in the release of airborne dust which may	
		Coatings	Metal oxides and diamond coatings are an integral part of the glass product. There is no separate exposure risk in normal use	
2.4	Aluminum Extrusions	Not Hazardous as supplied	Is not a health hazard under normal conditions. Fines particles from processing (grinding, cutting, polishing & welding) may ignite or create an explosive atmosphere. Fine particles in contact with water or humidity may release flammable gases in hazardous quantities, and potentially set off thermal reactions in contact with iron oxide	
2.5	Silicon Rubber Seals & Parts	Not Hazardous	No significant adverse effects from a single exposure expected from	
2.6	Stainless Steel Screws	Not Hazardous as supplied	Dust and fumes from subsequent processes can be Hazardous	If exposed seek medical advise
2.7	Silicon Sealant	ACUTE: Low Hazard		
		Contact with Eyes	Can cause Eye irritation	Flush Eyes with water for 15 min. Seek medical attention if
		Contact with Skin	No significant irritation from single short term exposure	Immediately Remove with dry cloth and wash exposed area

		Ingestion	Repeated Ingestion of large amount may cause injury	Wash product out of mouth and seek medical
		Inhalation	No significant effects from single short term exposure of fumes	Not Applicable
		CHRONIC: Low Hazard		
		Contact with Eyes	No Known Health Effects	No Information available
		Contact with Skin	No Known Health Effects	No Information available
		Ingestion	Repeated Ingestion of large amount may cause Injury	Seek Medical Advise
		Inhalation	No Known Health Effects	No Information available
2.8	Compressed Argon Gas	ACUTE: Low Hazard		
		Suffocation	Can cause Suffocation if displacing oxygen in the air	WARNING: Do not use in Unventilated or Confined
		Contact with Eyes	Not Applicable	
		Contact with Skin	Not Applicable	
		Ingestion	Not Applicable	
		Inhalation	Not Applicable	NOTE: If over-exposure is suspected then seek immediate
		CHRONIC: Low Hazard		
		Contact with Eyes	Not Applicable	
		Contact with Skin	Not Applicable	
		Ingestion	Not Applicable	
		Inhalation	Not Applicable	

IMPORTANT NOTE: Seek Medical Advise: if any experiencing irregular symptoms or any irritation/s persist

(3.0) COMPOSITION / INFORMATION ON INGREDIENTS AND COMPONENTS

PRODUCT		HAZARDOUS INGREDIENTS/COMPONENTS IDENTIFIED		
3.1	FULLY ASSEMBLED PRODUCT	No Hazardous Ingredient or Components		
	COMPONENT PARTS	No Hazardous Ingredient or Components		
3.2	Stainless Steel Bars/Frames	316 Stainless Steel This product is not hazardous in its solid state but contains hazardous constituent parts - see		
		Constituent Components	Permissible Exposure Limit	Threshold Limit
		Iron 60-72%	10mg/m3	5mg/m3
		Chromium 16-19%	0.5mg/m3	0.5mg/m3

		Nickel 10-15%	1mg/m3	1mg/m3
		Molybdenum 2-3%	5mg/m3 (sol)	10mg/m3 (insol)
		Manganese 0-2 %	5mg/m3 C	0.2mg/m3
		Copper 0-0.5%	1mg/m3 (Fumes 0.1 mg/m3	1mg/m3 (Fumes 0.1 mg/m3
		Cobalt 1-1%	10mg/m3	0.2mg/m3
3.3	Toughened Glass Panes	No Hazardous Ingredient or Components		
3.4	Aluminum Extrusions	This product is not hazardous in its solid state but contains hazardous constituent parts - see below		
		Constituent Components	Permissible Exposure Limit	Respirable Exposure Limit
		Aluminum <=75%	10mg/m3	4mg/m3
		Silicon <=15%	10mg/m3	3mg/m3
		Zinc <=12%	5mg/m3	5mg/m3
		Copper <=10%	1mg/m	0.1mg/m3
		Magnesium <=5 %	10mg/m3	4mg/m3
		Iron <=3%	10mg/m3	4mg/m3
		Manganese <=2%	0.2mg/m3	0.2mg/m3
		Nickle <1%	0.05mg/m3	0.015mg/m3
		Lithium <1%	0.025mg/m3	0.025mg/m3
		Silver <=0.7%	0.01mg/m3	0.01mg/m3
		Titanium <=0.5%	10mg/m3	4mg/m3
		Chromium <=0.5%	2mg/m3	5mg/m3
		Zirconium <=0.5%	5mg/m3	1.3mg/m3
		Vanadium <=0.5%	1mg/m3	1mg/m3
		Bismuth <=0.5%	5mg/m3	5mg/m3
		Strontium <=0.5%	0.1mg/m3	N/A
		Lead <=0.3%	0.05mg/m3	0.05mg/m3
3.5	Silicon Rubber Seals & Parts	No Hazardous Ingredient (according to European Commission Directive 1999/45/EC - Article 3 (3))		
		Chemical Characteristics	Mixture (unknown)	
		Physical Form	Rubber, Colour as delivered	
3.6	Stainless Steel Screws	316 Stainless Steel This product is not hazardous in its solid state but contains hazardous constituent parts - see		

		Constituent Components	Permissible Exposure Limit	Threshold Limit
		Iron 60-72%	10mg/m3	5mg/m3
		Chromium 16-19%	0.5mg/m3	0.5mg/m3
		Nickel 10-15%	1mg/m3	1mg/m3
		Molybdenum 2-3%	5mg/m3 (sol)	10mg/m3 (insol)
		Manganese 0-2 %	5mg/m3 C	0.2mg/m3
		Copper 0-0.5%	1mg/m3 (Fumes 0.1 mg/m3	1mg/m3 (Fumes 0.1 mg/m3
		Cobalt 1-1%	10mg/m3	0.2mg/m3
3.7	Silicon Sealant	No Hazardous Ingredient or Components (ref IMO)	Guide Only: TWA 3ppm STEL 10ppm AIHA WEEL 10ppm	Unknown
3.8	Compressed Argon Gas	No Hazardous Ingredient or Components when used under normal conditions		

(4.0) FIRE RISKS AND FIREFIGHTING MEASURES

PRODUCT		HAZARDOUS INGREDIENTS/COMPONENTS IDENTIFIED
4.1	FULLY ASSEMBLED PRODUCT	Non-Flammable
	COMPONENT PARTS	Non-Flammable
4.2	Stainless Steel Bars/Frames	Non-Flammable
4.3	Toughened Glass Panes	Non-Flammable
4.4	Aluminum Extrusions	Generally Non-Flammable. But fine particles in contact with water may generate flammable gases, dust
4.5	Silicon Rubber Seals & Parts	Non-Flammable
4.6	Stainless Steel Screws	Non-Flammable
4.7	Silicon Sealant	Non-Flammable
4.8	Compressed Argon Gas	Non-Flammable
4.9	General	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide, dry chemical or water spray. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool. Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving

(5.0) HANDLING AND STORAGE

PRODUCT		IDENTIFIED
5.1	FULLY ASSEMBLED PRODUCT	Handle with Care. Use appropriate lifting equipment and use as per manufacturers instruction

	COMPONENT PARTS	
5.2	Stainless Steel Bars/Frames	No special requirement
5.3	Toughened Glass Panes	Glass will break easily. Avoid risk of dropping, impact and excessive vibration. Handle with Care. Use appropriate lifting equipment and use as per manufacturers instruction
5.4	Aluminum Extrusions	No special requirement
5.5	Silicon Rubber Seals & Parts	No special requirement
5.6	Stainless Steel Screws	No special requirement
5.7	Silicon Sealant	Keep container closed and airtight, do not allow the container to be punctured. Store upright. Store in Cool Area. Do not expose to heat.
5.8	Compressed Argon Gas	Use hand truck (with straps) to move. Do not drag, roll, slide or drop cylinder. Do not lift by the valve or protection cap. Do not insert objects into valve cap as this may cause the valve to leak. Use a strap wrench to remove over-tight or rusted caps. Store in ventilated area. Stored upright with valve protection cap secured. Protect cylinders from physical damage. Storage area should not exceed 52°C. Full and empty cylinders should be stored separately. Do not store full containers

(6.0) EXPOSURE CONTROLS AND PROTECTION MEASURES

PRODUCT		Protective Clothing and Equipment
6.1	FULLY ASSEMBLED PRODUCT	Use Protective Gloves. Wear Safety Vest and Steel Capped Safety Shoes
	COMPONENT PARTS	
6.2	Stainless Steel Bars/Frames	Always use Protective Gloves. Safety Glasses and a Face Shield are highly recommended when grinding. Wear Safety Vest and Steel Capped Safety Shoes at all times. Exhaust ventilation is recommended to control emissions when the metal is being machined, cut, ground, welded or melted. If industrial hygiene monitoring reveals any over exposure then controls are required to be installed to reduce exposures below OSH permissible exposure limits. In the absence of exposure controls, wear an approved respirator/mask for the type of particulate generated. SEE
6.3	Toughened Glass Panes	The greatest risk in the handling and storage of glass are cuts and abrasions. Take appropriate precautions: use eye protection (as toughened glass can explode), cuffed gloves, protective footwear, safety helmet. When cutting or grinding, always use face and eye shields. Wet methods to reduce dust are recommended for grinding and cutting
6.4	Aluminum Extrusions	No special controls necessary under normal conditions. Employ adequate ventilation for metallic dust generated by grinding, sawing or polishing operations. Respiratory equipment is not required under recommended conditions of use. In the case dust or fumes being released, protective equipment is required if exposure limits are exceeded. Wear Protective Gloves. SEE
6.5	Silicon Rubber Seals & Parts	Wear gloves
6.6	Stainless Steel Screws	see section 6.2 if subsequent re-processing of this product is done
6.7	Silicon Sealant	Use in ventilated areas/outside or use suitable respiratory protection otherwise.
6.8	Compressed Argon Gas	Wear safety vest, safety glasses and steel capped safety shoes. Do not use in unventilated or confined areas

(7.0) ACCIDENTAL RELEASE MEASURES

PRODUCT	PERSONAL PRECAUTIONS	ENVIRONMENTAL PRECAUTIONS	METHODS FOR CLEAN-UP
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7.1	FULLY ASSEMBLED PRODUCT	Not Applicable	Not Applicable	Not Applicable
	COMPONENT PARTS			
7.2	Stainless Steel Bars/Frames	This product does not pose a hazard to the environment in its solid state		
7.3	Toughened Glass Panes	Use protective gloves when cleaning up broken glass	Not considered hazardous waste. Recycling glass is recommended	Sweep up all glass fragment and deposit into
7.4	Aluminum Extrusions	See Section 6	Collect for recycling	Sweep up dust/fines. Deposit into recycling
7.5	Silicon Rubber Seals & Parts	None needed	None required. Good disposal practice is recommended	Use good industrial hygiene practices
7.6	Stainless Steel Screws	This product does not pose a hazard to the environment in its solid state		
7.7	Silicon Sealant	Use protective gloves when cleaning up spills	Shut off all ignition sources. Contain spill. Clean-up spill	Clean any spills before product is allowed to
7.8	Compressed Argon Gas	Evacuate personnel from affected area	None required	None required

(8.0) PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT		PHYSICAL PROPERTIES	CHEMICAL PROPERTIES	OTHER NOTE
8.1	FULLY ASSEMBLED PRODUCT	Not Applicable	Not Applicable	Non Hazardous
	COMPONENT PARTS			
8.2	Stainless Steel Bars/Frames	Metal (solid)	High Chrome Steel (316)	Non-hazardous in its solid form For constituent parts
		Boiling Point	Not Applicable	
		Vapour Pressure	Not Applicable	
		Vapour Density	Not Applicable	
		Specific Gravity	7.5-8.5 (H2O=1)	
		Melting Point	1315-1540°C	
		Evaporation Rate	Not Applicable	
		Solubility in Water	Insoluble	
		Appearance	Silver/Grey/Metallic	
		Odor	Odorless	
8.3	Toughened Glass Panes	Glass	Silica Glass	Non-Hazardous
8.4	Aluminum Extrusions	Metal (solid)	Aluminum Alloy	Non-hazardous in its solid form For constituent parts
		Boiling Point	2467°C	
		Relative Density	2.7 g/cm3	

		Specific Gravity	2.55-2.80	
		Melting Point	660°C	
		Explosive Property	Non-explosive in solid state	
		Solubility in Water	Insoluble	
		Appearance	Silver/silver-grey	
		Odor	Odorless	
8.5	Silicon Rubber Seals & Parts	Rubber	Not Determined	Non-Hazardous
8.6	Stainless Steel Screws	Metal (solid)	High Chrome Steel (316)	Non-hazardous in its solid form For constituent parts
		Boiling Point	Not Applicable	
		Vapour Pressure	Not Applicable	
		Vapour Density	Not Applicable	
		Specific Gravity	7.5-8.5 (H2O=1)	
		Melting Point	1315-1540°C	
		Evaporation Rate	Not Applicable	
		Solubility in Water	Insoluble	
		Appearance	Silver/Grey/Metallic	
		Odor	Odorless	
8.7	Silicon Sealant	Liquid Paste	Very Viscous	Non-Hazardous
		Boiling Point	Not Determined	
		Vapour Pressure	Negligible (25°C)	
		Vapour Density	>1	
		Specific Gravity	1.05 (25°C)	
		Melting Point	Not Determined	
		Evaporation Rate	<1 (Butyl Acetate=1)	
		Solubility in Water	Not Soluble	
		Appearance	Paste, colour as detailed on cartridge	
		Odor	Oxime	
8.8	Compressed Argon Gas	Gaseous	Inert Gas	Non Hazardous
		Boiling Point	-185.9°C (1 atm)	

		Flash Point	Not Applicable	
		Auto Ignition	Non-Flammable	
		Flammability	Non-Flammable Gas	
		Vapour Pressure	Not Applicable	
		Vapour Density	1.650 kg/m ³ @ 21.1°C and 1 atm	
		Specific Gravity	1.38 @ 21.1°C and 1 atm	
		Molecular Weight	39.95	
		Melting Point	-189.2°C (1 atm)	
		Expansion Ratio	Not Applicable	
		Evaporation Rate	Not Applicable	
		Solubility in Water	Vol/Vol at 0°C: 0.056	
		Appearance	Invisible Gas	
		Odor	Odorless	

(9.0) Stability and Reactivity

PRODUCT		Stability (Avoid)	Hazardous Decomposition	Incompatibility (Materials to Avoid)
9.1	FULLY ASSEMBLED PRODUCT	Not Applicable	Not Applicable	Not Applicable
	COMPONENT PARTS			
9.2	Stainless Steel Bars/Frames	Stable	None	Some acids, bases and oxidisers
9.3	Toughened Glass Panes	Stable	None	None Known
9.4	Aluminum Extrusions	Stable under normal conditions	None	None in solid state. May react with some metal
9.5	Silicon Rubber Seals & Parts	Stable	Carbon Oxides. Silicon Dioxide. Formaldehyde. Burned Carbon	Can react with strong oxidising agents
9.6	Stainless Steel Screws	Stable	None	Some acids, bases and oxidisers
9.7	Silicon Sealant	Stable	Water and humidity can cause Methylethylketoxime. Thermal breakdown may produce the following hazardous materials: Carbon & Nitrogen oxides, burned carbon, SO ₂ , Formaldehyde	Avoid contact with water or moisture
9.8	Compressed Argon Gas	Stable	None	None

(10.0) Toxicology Information

	PRODUCT			
10.1	FULLY ASSEMBLED PRODUCT	Possible Health Effects	None	Ref Section 3 for constituent parts
	COMPONENT PARTS			
10.2	Stainless Steel Bars/Frames	ACUTE & CHRONIC EFFECTS	Non Known	Ref Section 3 for constituent parts
		Possible Health Effects	Non Known	Ref Section 3 for constituent parts
		Skin/Eye Irritation	Non-Known	Ref Section 3 for constituent parts
		Sensitization	Non-Known	Ref Section 3 for constituent parts
		Reproductive Effects	Constituent ingredients Chromium & Nickel are known to cause reproductive toxicity including hexavalent compounds from pyrometallurgical processing	
		Carcinogenic Effects	Constituent ingredients Chromium & Nickel are known to cause cancer including hexavalent compounds from pyrometallurgical	
		Other Health Hazards	No known applicable Information	
		Stainless Steel alloys are not considered hazardous in solid form (rod/bar, wire, tubing, strip, sheet etc) However, if subsequent processing involves machining, grinding, melting, welding, cutting, or any process that causes the release of dust or fumes, then hazardous levels of the constituents parts of these alloys can be generated (See Section 3)- ALWAYS USE PROTECTION		
10.3	Toughened Glass Panes	ACUTE & CHRONIC EFFECTS	Non-Known	Ref Section 3 for constituent parts
		Possible Health Effects	Non-Known	Ref Section 3 for constituent parts
		Skin/Eye Irritation	Non-Known	Ref Section 3 for constituent parts
		Sensitization	Non-Known	Ref Section 3 for constituent parts
		Reproductive Effects	Non-Known	Ref Section 3 for constituent parts
		Carcinogenic Effects	Non-Known	Ref Section 3 for constituent parts
		Other Health Hazards	No known applicable Information	Ref Section 3 for constituent parts
		Fabrication operations such as cutting, grinding, seaming, edging or breaking may result in the release of airborne dust which may present a health hazard. Dust is an amorphous silicate and		
10.4	Aluminum Extrusions	ACUTE & CHRONIC EFFECTS	Non-Known	Ref Section 3 for constituent parts
		Skin/Eye Irritation	Non-Known	Ref Section 3 for constituent parts
		Sensitization	Non-Known	Ref Section 3 for constituent parts
		Reproductive Effects	Non-Known	Ref Section 3 for constituent parts
		Carcinogenic Effects	Non-Known	Ref Section 3 for constituent parts
		Other Health Hazards	No known applicable Information	Ref Section 3 for constituent parts
10.5	Silicon Rubber Seals & Parts	ACUTE & CHRONIC EFFECTS	None Known	Ref Section 3 for constituent parts
		Possible Health Effects	None Known	Ref Section 3 for constituent parts

		Skin/Eye Irritation	None Known	Ref Section 3 for constituent parts
		Sensitizing Effects	None Known	Ref Section 3 for constituent parts
		Reproductive Effects	None Known	Ref Section 3 for constituent parts
		Carcinogenic Effects	None Known	Ref Section 3 for constituent parts
		Other Health Hazards	No known applicable Information	Ref Section 3 for constituent parts
		The above listed potential effects of overexposure are based on actual data, the results of studies performed upon similar compositions, component data, and/or expert review of the products		
10.6	Stainless Steel Screws	ACUTE & CHRONIC EFFECTS	Non-Known	Ref Section 3 for constituent parts
		Possible Health Effects	Non-Known	Ref Section 3 for constituent parts
		Skin/Eye Irritation	Non-Known	Ref Section 3 for constituent parts
		Sensitization	Non-Known	Ref Section 3 for constituent parts
		Reproductive Effects	Constituent ingredients Chromium & Nickel are known to cause reproductive toxicity including hexavalent compounds from pyrometallurgical processing	
		Carcinogenic Effects	Constituent ingredients Chromium & Nickel are known to cause cancer including hexavalent compounds from pyrometallurgical	
		Other Health Hazards	No known applicable Information	
		Stainless Steel alloys are not considered hazardous in solid form (rod/bar, wire, tubing, strip, sheet). However, if subsequent processing involves machining, grinding, melting, welding, cutting, or any process that causes the release of dust or fumes, then hazardous levels of the constituents parts of these alloys can be generated (See Section 3)- ALWAYS USE PROTECTION		
10.7	Silicon Sealant	ACUTE & CHRONIC EFFECTS	see decomposition materials in Section 9	
		Possible Health Effects	Non-Known	
		Irritation	Non-Known	
		Sensitizing Effects	Can cause severe eye irritation and mild skin irritation	
		Reproductive Effects	Non-Known	
		Synergistic Material	Non-Known	
		Other Health Hazards	Extreme exposure or ingestion can be hazardous to health	
10.8	Compressed Argon Gas	ACUTE & CHRONIC EFFECTS		
		Possible Health Effects	Non-Known	
		Irritation	Non-Known	
		Sensitizing Effects	Non-Known	
		Reproductive Effects	Non-Known	
		Synergistic Material	Non-Known	
		Other Health Hazards	No known applicable Information	

(11.0) Ecological Information

PRODUCT		Environmental Effects	Bioaccumulation	Environmental Distribution Effect
11.1	FULLY ASSEMBLED PRODUCT	No Adverse Effects Known		
	COMPONENT PARTS			
11.2	Stainless Steel Bars/Frames	No Adverse Effects Known		
11.3	Toughened Glass Panes	No Adverse Effects Known		
11.4	Aluminum Extrusions	No Adverse Effects Known		
11.5	Silicon Rubber Seals & Parts	No Adverse Effects Known		
11.6	Stainless Steel Screws	No Adverse Effects Known		
11.7	Silicon Sealant	No Adverse Effects Known		
11.8	Compressed Argon Gas	No Adverse Effects Known		

(12.0) Disposal Considerations

PRODUCT		
12.1	FULLY ASSEMBLED PRODUCT	Refer to COMPONENT PARTS Below
	COMPONENT PARTS	
12.2	Stainless Steel Bars/Frames	Recycling of metallic byproducts and off-cuts is strongly encouraged. If byproducts need to be treated and/or disposed of as wastes, hazardous waste methods must be employed. For recycling and disposal, ensure compliance with all local and national by-laws and regulations
12.3	Toughened Glass Panes	Glass and glass dust should be recycled where at all possible. Glass is not generally considered a hazardous waste. If disposal is necessary, then dispose as an industrial waste or as per local
12.4	Aluminium Extrusions	Recycling of metallic byproducts and off-cuts is strongly encouraged. If byproducts need to be treated and/or disposed of as wastes, hazardous waste methods must be employed. For recycling and disposal, ensure compliance with all local and national by-laws and regulations
12.5	Silicon Rubber Seals & Parts	Can be land-filled or burned in a chemical incinerator equipped with an afterburners and scrubber Do not dispose the emptied container unlawfully. Observe local and national regulations.
12.6	Stainless Steel Screws	Recycling of metallic byproducts and off-cuts is strongly encouraged. If byproducts need to be treated and/or disposed of as wastes, hazardous waste methods must be employed. For recycling and disposal, ensure compliance with all local and national by-laws and regulations
12.7	Silicon Sealant	Can be land-filled for cured product or burned in a chemical incinerator equipped with an afterburners and scrubber Do not dispose the emptied container unlawfully. Observe local and
12.8	Compressed Argon Gas	Do not dispose of residual or unused quantities. Contact your supplier for safe disposal instruction. For emergency disposal, discharge slowly to the atmosphere in a well-ventilated area or outdoors

(13.0) Transport Information

PRODUCT	
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13.1	FULLY ASSEMBLED PRODUCT		The Assembled MSA - ONE SYSTEM is often large and heavy. Suitable fixing of the product is important. Compliance with all statutory and local regulations and all necessary safety precautions should be observed. Always wear appropriate safety clothing and footwear
	COMPONENT PARTS		
13.2	Stainless Steel Bars/Frames		The Assembled MSA - ONE SYSTEM is often large and heavy. Suitable fixing of the product is important. Compliance with all statutory and local regulations and all necessary safety precautions should be observed. Always wear appropriate safety clothing and footwear
13.3	Toughened Glass Panes		Glass panes are often large and heavy. Suitable fixing of the product is important. Compliance with all statutory and local regulations and all necessary safety precautions should be observed. Always wear appropriate safety clothing and footwear
13.4	Aluminium Extrusions		Suitable fixing of the product is important. Compliance with all statutory and local regulations and all necessary safety precautions should be observed. Always wear appropriate safety clothing &
13.5		Silicon Rubber Seals & Parts	No special transportation Issues or Requirements
13.6		Stainless Steel Screws	No special transportation Issues or Requirements
13.7		Silicon Sealant	No special transportation Issues or Requirements
13.8		Compressed Argon Gas	Cylinders should be transported in a secure position, in a well-ventilated vehicle. It is strongly recommended not to transport compressed gas containers in automobiles, in closed-body vehicles, or by non-licensed

(14.0)RegulatoryInformation

PRODUCT		
14.1	FULLY ASSEMBLED PRODUCT	Refer to COMPONENT PARTS Below
	COMPONENT PARTS	
14.2	Stainless Steel Bars/Frames	No known applicable Information
14.3	Toughened Glass Panes	No known applicable Information
14.4	Aluminum Extrusions	No known applicable Information
14.5	Silicon Rubber Seals & Parts	No known applicable Information
14.6	Stainless Steel Screws	See NZ Standard NZS 3604 (sea-spray zones)
14.7	Silicon Sealant	NZS 5433 - Not dangerous goods
14.8	Compressed Argon Gas	NFPA RATINGS: HEALTH =0; FLAMMABILITY =0; INSTABILITY: =0; SPECIAL: SASTANDARD VALVE CONNECTIONS (THREADED) 0-3000 psig CGA 580, 3001-5500 psig CGA 680, 5501-7500 psig CGA 677, ULTRA HIGH INTEGRITY: 0-3000 psig 718 (YOKE) NA. DO NOT USE ADAPTERS. DO NOT FORCE FIT

(15.0) Other Information

GENERAL WARNING		For abnormal use or repetitive exposure to any of the above seek medical advise and/or treatment
15.1	FULLY ASSEMBLED PRODUCT	The MSA - ONE SYSTEM product is an exterior wall panel, window or door assembly, manufacture from the COMPONENT PARTS listed below. Users should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

	IMPORTANT LEGAL NOTICE	The information presented above is believed to be accurate and reliable to the best of our knowledge as typical values and NOT as a product specification. MSANZ Limited makes no warranties expressed or implied regarding this information. In addition, since the use of the product is not within the control of MSANZ Limited, it is the user's obligation to determine the conditions of safe use of the product.
15.2	Stainless Steel Bars/Frames	Sharp edges and burrs can cause injury. Metal products should be handled with care at all times
15.3	Toughened Glass Panes	Glass can be dangerous. Edges are sometimes sharp. This product should handled with care at all
15.4	Aluminum Extrusions	Sharp edges and burrs can cause injury. Metal products should be handled with care at all times
15.5	Silicon Rubber Seals & Parts	
15.6	Stainless Steel Screws	
15.7	Silicon Sealant	Silicon Seal are a liquid that cure into a solid when exposed to air. Care should be taken when using this product at all times
15.8	Compressed Argon Gas	Compressed gas can be dangerous and should handled with care at all times

Appendix 3

MSA ONE – Assembly Parts

1.1 MSA-ONE Multi Glazed WALL Systems

The following is a list of the components used for the manufacture of the Multi Glazing WALL SYSTEM including Vertical Door and Window Jambs Sliding Walls and Butt Joints:

PART	PART No.
• 8mm Toughened and Ground Glass Panes	101-00
• Stainless Steel Framing (Square Edge Type1)	102-S1
• Stainless Steel Framing (Bevelled Edge Type1)	102-B1
• Stainless Steel Framing (Square Edge Type2 Seal)	102-S2
• Stainless Steel Framing (Bevelled Edge Type2 Seal)	102-B2
• Stainless Steel Framing (Square Edge Type2 Jamb)	103-S2
• Stainless Steel Framing (Bevelled Edge Type2 Jamb)	103-B2
• Stainless Steel Framing (Back Seal Type 2 two-piece)	103-T2
• Stainless Steel Fixing Brackets external (Type1 Top Fixed)	105-T1
• Stainless Steel Fixing Brackets external (Type2 Top Dynamic)	105-T2
• Stainless Steel Fixing Brackets external (Type3 Top Universal)	105-T3
• Stainless Steel Fixing Brackets external (Type4 Dynamic-Spring)	105-T4
• Stainless Steel Fixing Brackets external (Type1 Bottom Fixed)	105-B1
• Stainless Steel Straight Fixing Brackets Internal	106-S1
• Stainless Steel Corner Fixing Brackets Internal	106-C1
• Extruded Aluminium Glass-Connectors (Corner Type)	107-C1
• Extruded Aluminium Glass-Connectors (Split Corner Type)	107-C2
• Extruded Aluminium Glass-Connectors (Single Split Corner)	107-C3
• Extruded Aluminium Glass-Connectors (Straight Type)	107-S1
• Extruded Aluminium Glass-Connectors (Split Straight Type)	107-S2
• Extruded Aluminium Square Tube Glass-Spacers (12mm)	108-01
• Stainless Steel Machine Screws (M6x10-CS)	109-01
• Stainless Steel Machine Screws (M6x16-CH)	109-02
• Stainless Steel Machine Screws (M8x20-CH)	109-03
• Extruded Silicon Rubber Seal (static)	110-S1
• Extruded Silicon Rubber Seal Mitre-Cut (static)	110-S2

• Extruded Silicon Rubber Seal Edge (static)	110-S3
• Extruded Silicon Rubber Seal Weather Shield (static)	110-S4
• Extruded Silicon Rubber Seal Frame to Frame (static)	110-S5
• Extruded Silicon Rubber Seal Jointers (static)	110-S6
• Extruded Silicon Rubber Seal (dynamic)	110-D1
• Extruded Silicon Rubber Buffers (8mm)	111-01
• Extruded Silicon Rubber Buffers (2mm)	111-02
• Moulded Silicon Rubber Corner Join Seals (Type1)	112-T1
• Moulded Silicon Rubber 3 Way Corner Join Seals (Type2)	112-T2
• Moulded Silicon Rubber Straight Join Seals (Type 3)	112-T3
• RTV Acetic Silicon Sealant	RTV-SS

1.2 MSA-ONE Multi Glazed OPENING (Doors and Windows) Systems

The following is a list of the components used for the manufacture of the Multi Glazed DOOR AND WINDOW SYSTEMS including Single, Double and Bi-Folding opening doors:

PART	PART No.
• 8mm Toughened and Ground Glass Panes	101-00
• Stainless Steel Framing (Square Edge Type1)	102-S1
• Stainless Steel Framing (Bevelled Edge Type1)	102-B1
• Stainless Steel Framing (Square Edge Type2 Seal)	102-S2
• Stainless Steel Framing (Bevelled Edge Type2 Seal)	102-B2
• Stainless Steel Framing (Square Edge Type2 Jamb)	103-S2
• Stainless Steel Framing (Bevelled Edge Type2 Jamb)	103-B2
• Stainless Steel Framing (Back Seal Type 2 two-piece)	103-T2
• Stainless Steel Bottom and Top Door/Window Jambs	104-T1
• Stainless Steel Straight Fixing Brackets Internal	106-S1
• Stainless Steel Corner Fixing Brackets Internal	106-C1
• Extruded Aluminium Square Tube Glass-Spacers (12mm)	108-01
• Stainless Steel Machine Screws (M6x10-CS)	109-01
• Extruded Silicon Rubber Seal (static)	110-S1
• Extruded Silicon Rubber Seal Mitre-Cut (static)	110-S2
• Extruded Silicon Rubber Seal (dynamic)	110-D1
• Extruded Silicon Rubber Buffers (8mm)	111-01
• Extruded Silicon Rubber Buffers (2mm)	111-02
• Moulded Silicon Rubber Corner Join Seals (Type1)	112-T1
• Hinge, Hinge Block and Hinge Pin Assembly	113-T1
• RTV Acetic Silicon Sealant	RTV-SS

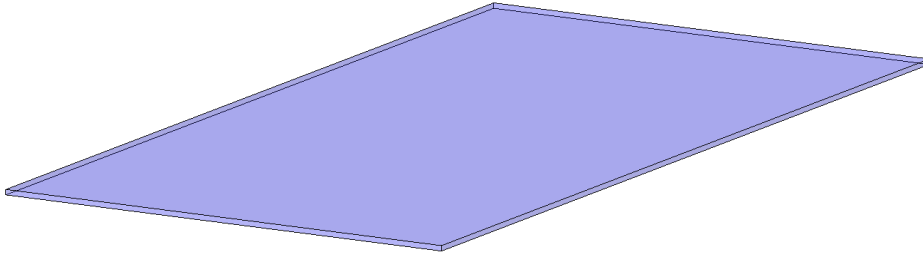
1.3 MSA-ONE Multi Glazed Sliding Assemblies

Sliding Assemblies can use all Parts as listed above for Walls, Doors, and Windows

PARTS

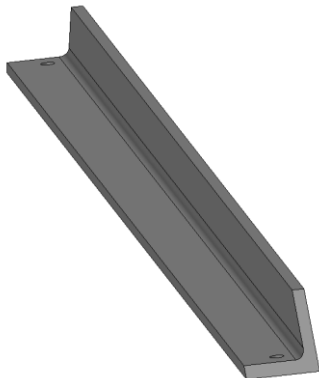
8mm Toughened and Ground Glass Panes

101-00



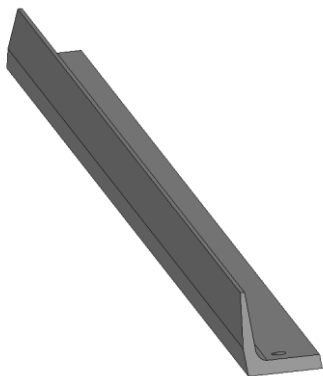
Stainless Steel Framing (Square Edge Type1)

102-S1



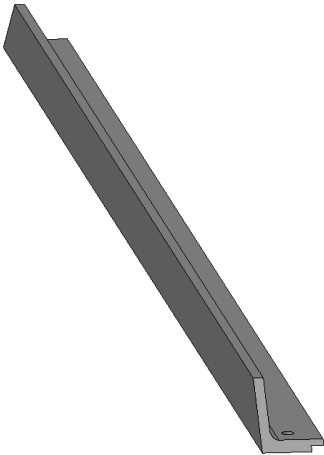
Stainless Steel Framing (Bevelled Edge Type1)

102-B1



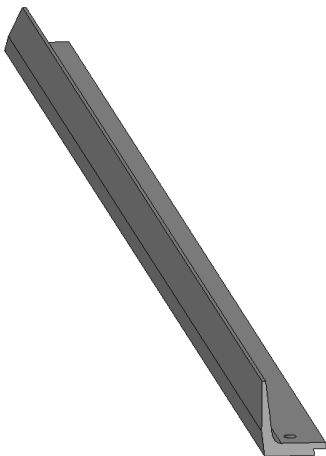
Stainless Steel Framing (Square Edge Type2)

102-S2



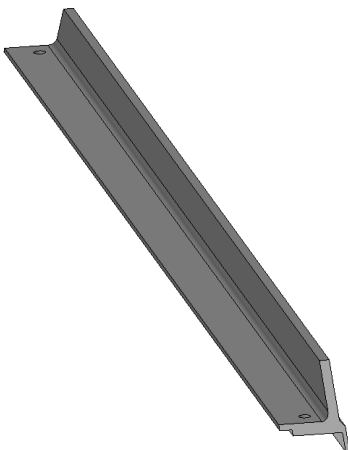
Stainless Steel Framing (Bevelled Edge Type2)

102-B2



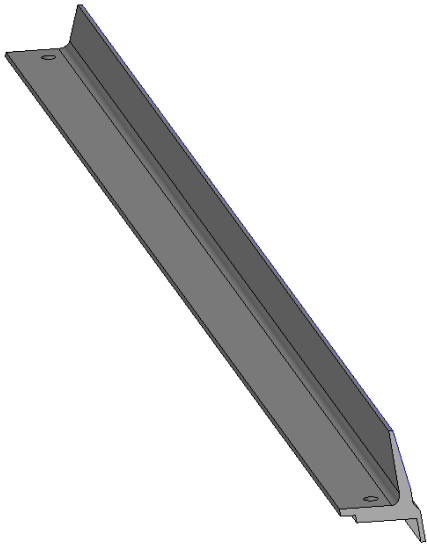
Stainless Steel Framing (Square Edge Type2 Jamb)

103-S2



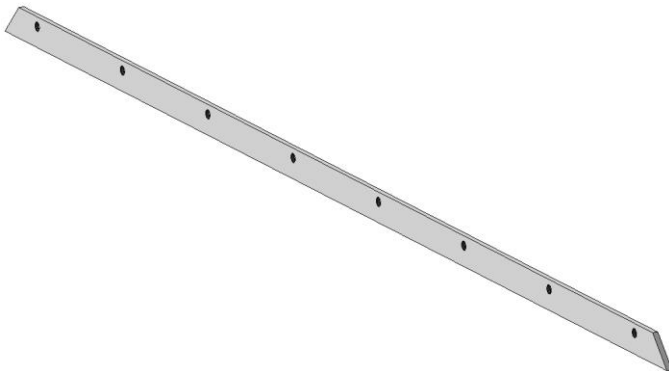
Stainless Steel Framing (Bevelled Edge Type2 Jamb)

103-B2



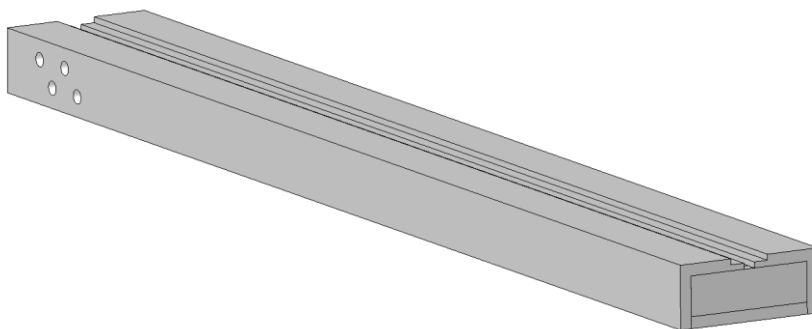
Stainless Steel Framing (Back Seal Type 2 two-piece)

103-T2



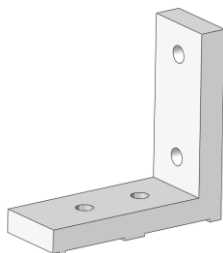
Stainless Steel Bottom and Top Door/Window Plate (Jamb)

104-T1



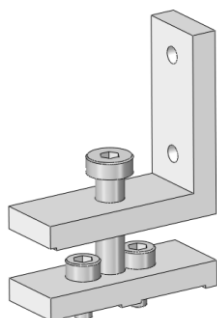
Stainless Steel Fixing Brackets external (Type1 Top Fixed)

105-T1



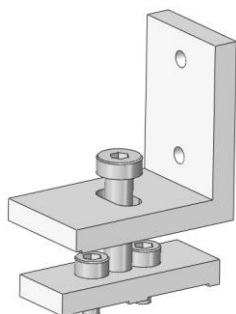
Stainless Steel Fixing Brackets external (Type2 Top Dynamic)

105-T2



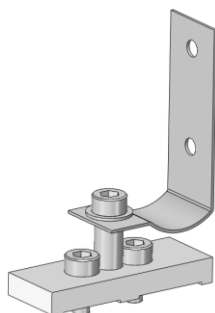
Stainless Steel Fixing Brackets external (Type3 Top Universal)

105-T3

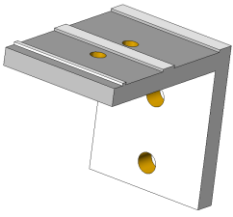


Stainless Steel Fixing Brackets external (Type4 Dynamic-Spring)

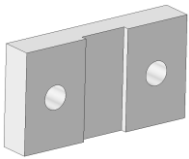
105-T4



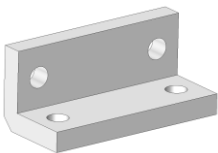
Stainless Steel Fixing Brackets external (Type1 Bottom Fixed) 105-B1



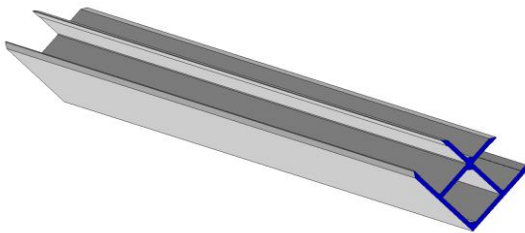
Stainless Steel Straight Fixing Brackets Internal 106-S1



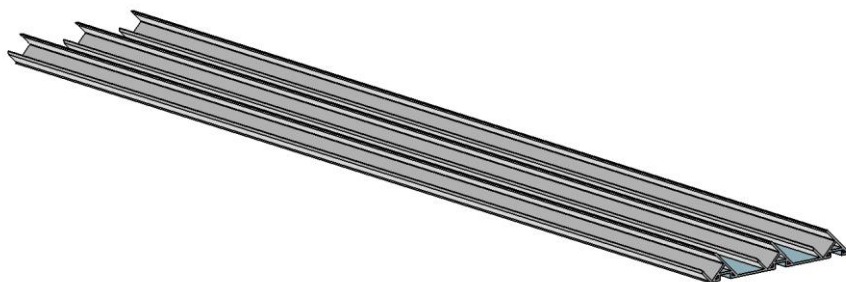
Stainless Steel Corner Fixing Brackets Internal 106-C1



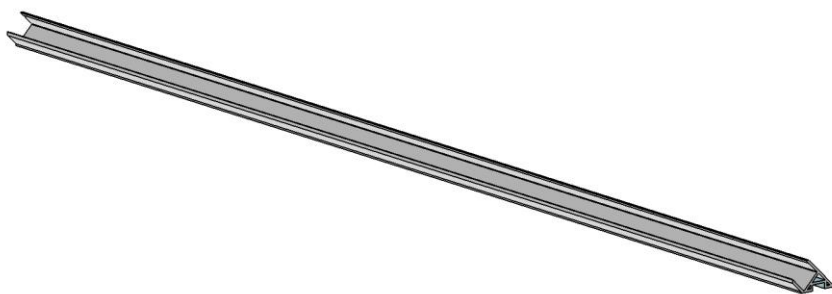
Extruded Aluminium Glass-Connectors (Corner Type) 107-C1



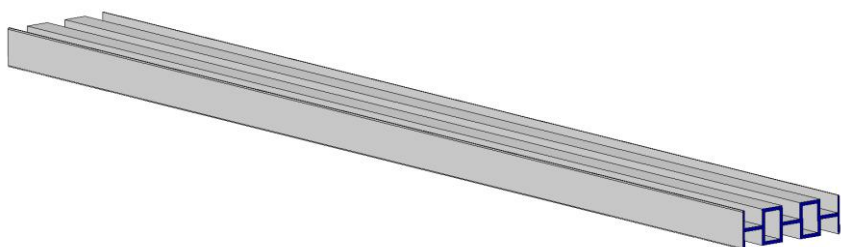
Extruded Aluminium Glass-Connectors (Split Corner Type) 107-C2



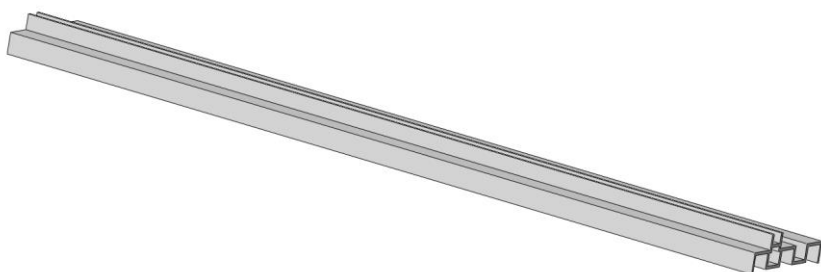
Extruded Aluminium Glass-Connectors (Single Split Corner) 107-C3



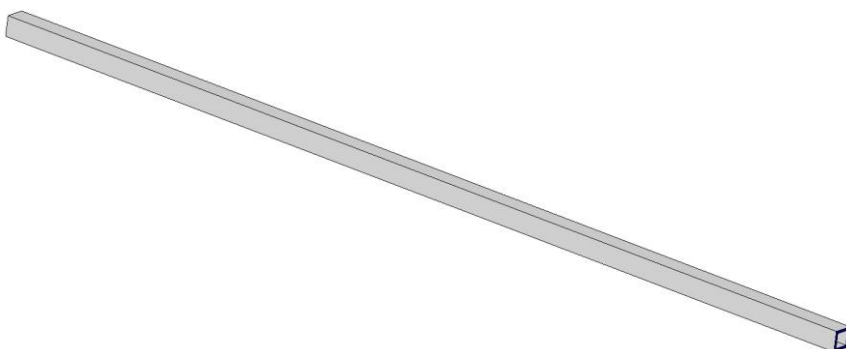
Extruded Aluminium Glass-Connectors (Straight Type) 107-S1



Extruded Aluminium Glass-Connectors (Split Straight Type) 107-S2



Extruded Aluminium Square Tube Glass-Spacers (12mm) 108-01



Stainless Steel Machine Screws (M6x10-CS)

109-01



Stainless Steel Machine Screws (M6x16-CH)

109-02



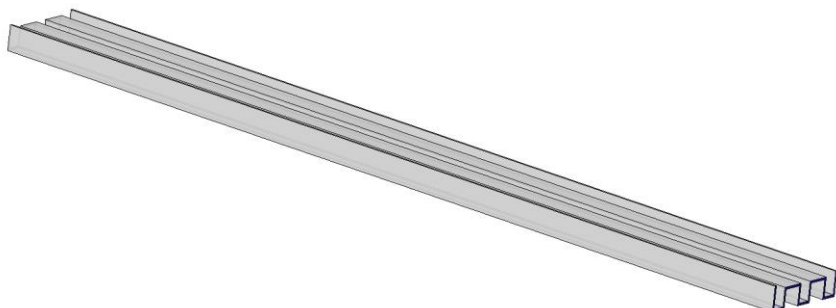
Stainless Steel Machine Screws (M8x28-CH)

109-03



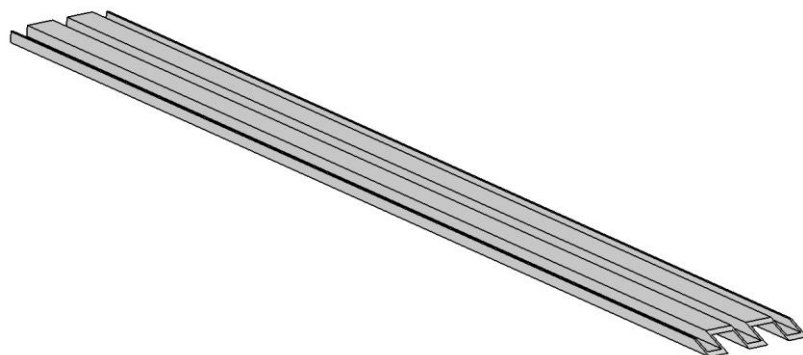
Extruded Silicon Rubber Seal (static)

110-S1



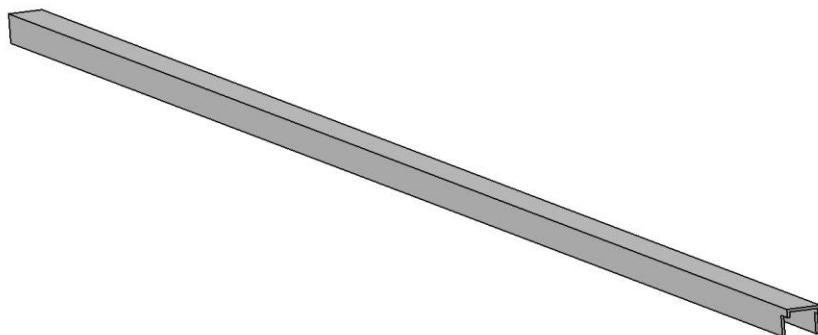
Extruded Silicon Rubber Seal Mitre-Cut (static)

110-S2



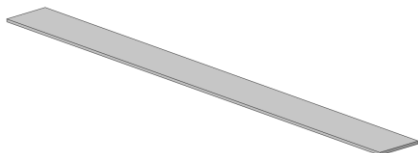
Extruded Silicon Rubber Corner Join Seal (static)

110-S3



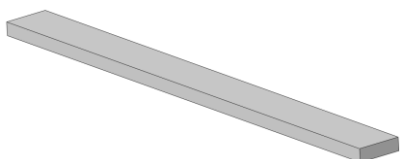
Extruded Silicon Rubber Seal (1 x 16 mm)

110-S4



Extruded Silicon Rubber Seal (5 x 17 mm)

110-S5



Extruded Silicon Rubber Seal (dia 2.5 mm)

110-S6



Extruded Silicon Rubber Seal (dynamic)

110-D1



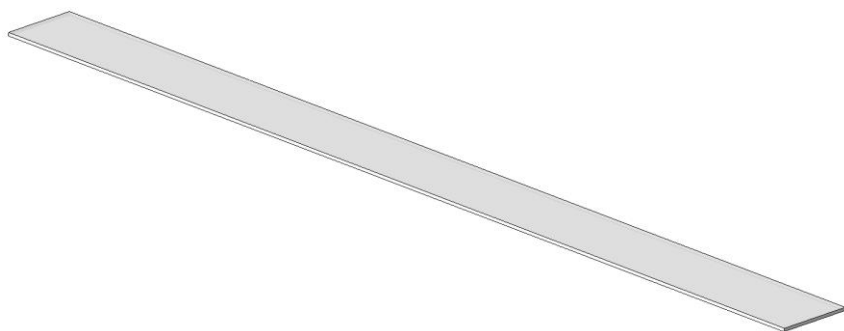
Extruded Silicon Rubber Buffers (8mm)

111-01



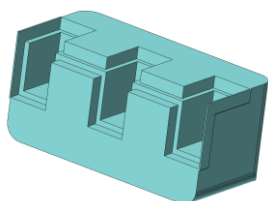
Extruded Silicon Rubber Buffers (2mm)

111-02



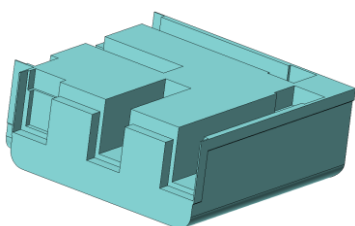
Moulded Silicon Rubber Corner Join Seals (Type1)

112-T1



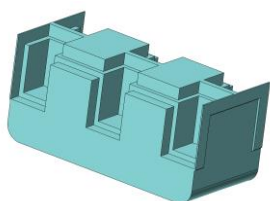
Moulded Silicon Rubber 3 Way Corner Join Seals (Type2)

112-T2



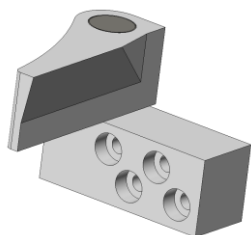
Moulded Silicon Rubber Straight Join Seals (Type 3)

112-T3



Hinge, Hinge-Block and Hinge-Pin Assembly

113-T1



RTV Acetic Silicon Sealant

RTV-SS



Appendix 4

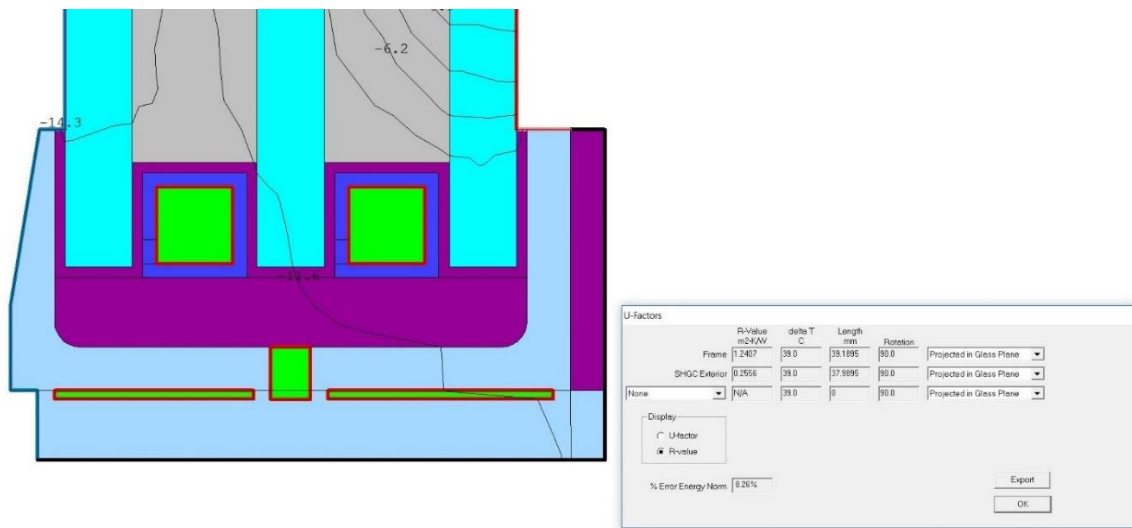
R-Value Calculations

LBNL THERM 7.4 and WINDOW 7.4 thermal modeling software

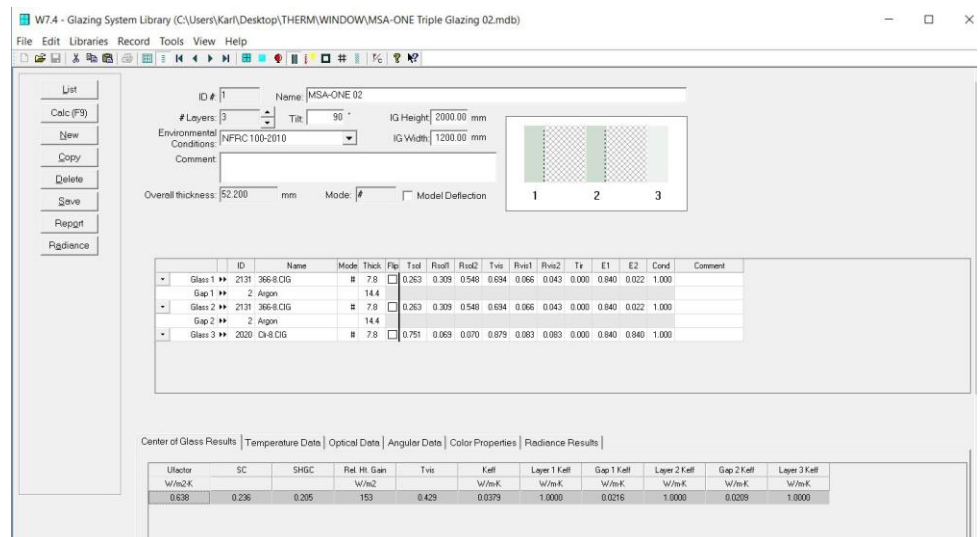
Technical Specifications (Double Silver Low-E):

- Glass 7.8mm Toughened Low Iron
- Cavities Argon Filled
- Double Silver Low-E Coating
- Stainless Steel (316) Frames
- Extruded Silicon Rubber Seals
- SHS Aluminium Extruded Spacers

FRAME MODEL



GLAZING MODEL

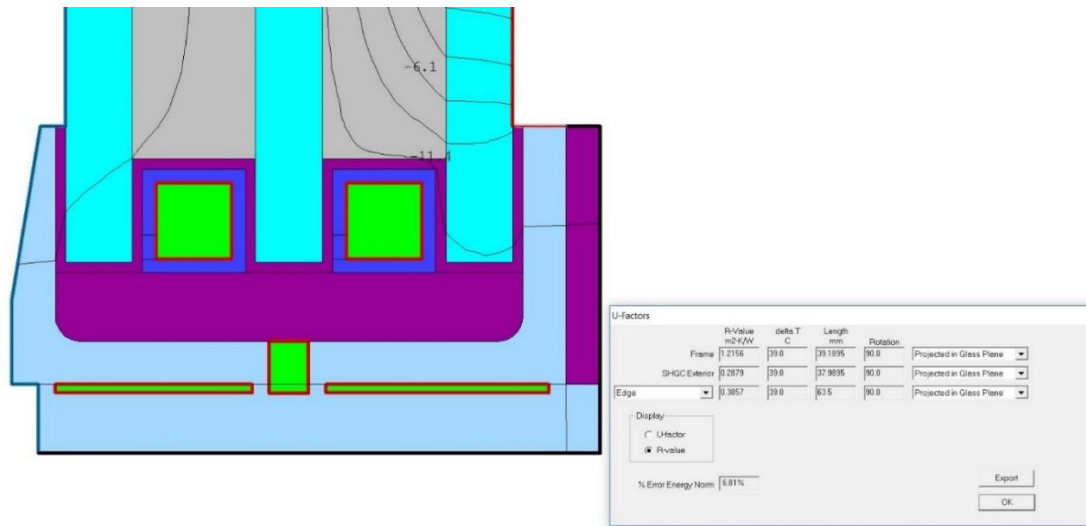


LBNL THERM 7.4 and WINDOW 7.4 thermal modeling software

Technical Specifications (Single Silver Low-E):

- Glass 7.8mm Toughened Low Iron
- Cavities Argon Filled
- Single Silver Low-E Coating
- Stainless Steel (316) Frames
- Extruded Silicon Rubber Seals
- SHS Aluminium Extruded Spacers

FRAME MODEL



GLAZING MODEL

