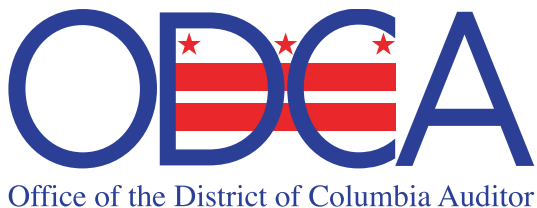

Oversight Failures Contribute to ODCA Workplace Injury

August 15, 2023

An internal audit for the Office of the D.C. Auditor



Audit Team
RSM US LLP



Kathleen Patterson, District of Columbia Auditor
www.dcauditor.org

August 15, 2023

The Hon. Muriel Bowser
Mayor of the District of Columbia
1350 Pennsylvania Avenue, N.W
Washington, DC 20004

The Hon. Phil Mendelson
Chairman, Council of the District of Columbia
The John A. Wilson Building
Washington, DC 20004

Dear Mayor Bowser and Chairman Mendelson:

The report that follows, **Oversight Failures Contribute to ODCA Workplace Injury**, is an internal audit report describing a workplace incident that occurred on January 25, 2023, in newly renovated space leased by the Department of General Services for the Office of the D.C. Auditor. A metal doorplate above a glass door dislodged and struck a senior ODCA employee on the head and arm. The employee suffered a concussion, remains out of work, is undergoing treatment, and receives District of Columbia worker's compensation. We hope for and expect a full recovery.

We contracted with construction audit firm RSM US LLP to undertake a deep dive on the circumstances of the workplace incident. We publish this internal audit report to document what occurred and underscore earlier ODCA recommendations. We respectfully ask the elected leaders of the District of Columbia to take seriously the need for robust internal controls with policies and practice that assure oversight of and adherence to *all* terms of *all* contracts entered into by the District of Columbia.

Our auditors found repeated failures associated with the glass doors installed throughout the office including the hardware installed to secure the materials. Interviews recounted instances prior to January 2023 when a doorplate was found on the office floor, having dislodged and fallen. Punch lists prepared by the architect and shared with the building owner, general contractor, and Department of General Services (DGS) representatives included instances where a doorplate was taped in place with adhesive. The audit found that none of the parties to the construction contacted the parts manufacturer for guidance on securing the doorplates, which ODCA has now done, as reflected in letters included as Appendix C.

In a 2019 white paper, **A Case for District-Wide Internal Control Standards**, ODCA called for a comprehensive approach to government oversight to ensure that every District program and service has standard operating procedures (SOPs) in place with staff trained, supervised, and held accountable for meeting SOP requirements. In our March 2023, report, **Multiple Failures in Roosevelt High School HVAC System** we recommended that DGS develop comprehensive standard operating procedures specific to building turnover when construction projects are completed. We were very sorry to see DGS claim in

recent correspondence with the Council that they continue to follow a protocol that has been in place since 2016. The experience with Roosevelt demonstrated both the inadequacy of and failure to adhere to current policies and practices.

ODCA school modernization audits over the last nine years have repeatedly shown government failure to adhere to laws, regulations, and SOPs and failure to hold contractors accountable for meeting all contract terms. Accountability must be a priority for District officials and staff. We ask District leaders to set *personal responsibility for meeting program objectives* as an expectation and a requirement for continued employment in the District's operating agencies including assuring vendor adherence to contract terms and deliverables.

We look forward to working with the Executive and Legislative branches of government to ensure that the District has in place policies, practices, and a commitment to accountability so that the kind of harm to individual health and safety experienced at ODCA and reflected in this internal audit is not repeated.

Thank you.

Sincerely yours,



Kathleen Patterson
District of Columbia Auditor

cc: D.C. Councilmembers
The Hon. Brian Schwalb, Attorney General
Kevin Donahue, City Administrator
Keith A. Anderson, Interim Deputy Mayor for Planning & Economic Development
Delano Hunter, Acting Director, Department of General Services
Jed Ross, Chief Risk Officer

Office of the District of Columbia Auditor

Internal Audit Report: Interior Office Door Systems and Products

June 2023



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TRANSMITTAL LETTER

June 15, 2023

Kathleen Patterson, D.C. Auditor
Office of the D.C. Auditor
717 14th Street NW 9th Floor
Washington D.C. 20005

Pursuant to our Consulting Services Agreement, dated February 23, 2023, we hereby present our internal audit report of interior office door systems and products. Our report is organized in the following sections:

Executive Summary	This provides a high-level overview and summary of the conclusions noted as part of our internal audit.
Background	This section includes an overview of the January 2023 safety incident, the Architect's specifications, and product submittals related to the interior office door systems.
Conclusions	This section includes a description of the conclusions and key takeaways noted during our internal audit and recommended actions.
Objectives and Approach	The objectives and approach of the internal audit are explained in this section.
Appendix A	This section includes the A601 – Door and Hardware Schedules included in the Architect's drawings.
Appendix B	This section includes the Subcontractor's "Glazing Walls and Glazing Hardware Submittal".

We would like to thank the staff and all those involved in assisting us with this internal audit.

Respectfully Submitted,

RSM US LLP

EXECUTIVE SUMMARY

In January 2023, the Office of the District of Columbia Auditor ("ODCA") moved into a renovated office space on the 7th and 8th floors of the National Place Building located at 1331 Pennsylvania Ave, NW. Construction of the office space began in April 2022 and was completed in December 2022. A Certificate of Occupancy was issued by the DC Department of Buildings on December 12, 2022. The scope of the project was an interior fit-out and renovation of approximately 8,000 square feet of existing office space. The design included, but was not limited to, new interior partitions, mechanical, electrical, and plumbing ("MEP"), lighting fixtures, ceilings, and life safety devices.

The project and building owner is Quadrangle Development Corporation ("Building Owner"), who leases the office space to the Department of General Services ("DGS"). The project was designed by demian/wilbur/architects ("Architect") and constructed by Ancora Construction Group, Inc. ("Contractor"). As part of the office renovation, new glass doors were installed in each of the interior office suites. The subcontractor responsible for installation of the doors, frames, and hardware was All Pro Glass, LLC ("Subcontractor"). Each office suite was fitted with a two-piece, snap-fit header above the glass door, which consists of a mounted housing that is mechanically fastened into the door frame, and a second piece that snaps into place without a fastener. A single acting door stop was fastened into each two-piece header to prevent the door from opening outward into the hallway and disrupting egress routes.

On January 25, 2023, a safety incident involving a senior staff member occurred in ODCA's newly constructed office. According to ODCA personnel, the staff member sustained an injury after a snap-in header dislodged from its housing and fell on the staff member's head and arm.

Approach

Our approach consisted of the following:

- Conducted interviews with stakeholders to gain an understanding of key events related to the ODCA's new office construction
- Obtained and reviewed scoping documents, specifications, and other documentation
- Obtained and reviewed product submittals for interior office doors and related components
- Obtained and reviewed manufacturer installation manuals for interior office doors and related components
- Conducted visual inspection of interior office door systems through review of photo documentation and on-site walkthroughs
- Performed a comparison of the Architect's specifications and the Subcontractor's product submittal for doors and hardware

At the conclusion of our audit, we summarized our findings into a written report, which was reviewed with the Office of the D.C. Auditor in June 2023.

Conclusions

While the products included in the Subcontractor's "Glazing Walls and Glazing Hardware Submittal" appeared to align with the door and hardware schedules included in the Architect's drawings, and additions/substitutions submitted by the Subcontractor were approved by the Architect, issues with the two-piece headers occurred during construction and through occupancy.

During interviews, stakeholders noted that components of the two-piece headers fell in multiple offices during construction, and ad-hoc remediation efforts were conducted to further secure the "snap-in" portion of the headers. Interviewees also noted that the Contractor and/or Subcontractor did not contact the manufacturer for additional guidance and troubleshooting.

RSM inquired with the manufacturer to obtain additional information regarding the door products and systems used in ODCA's interior office suites. During our discussion, the manufacturer acknowledged that the snap-in piece of the header could dislodge if pressure is applied to the door stop. Several recommendations were provided by the manufacturer, who could have provided additional guidance prior to the January 2023 safety incident following the initial identification of issues with the two-piece headers.

BACKGROUND

Quick Facts
Building Owner
Quadrangle Development Corp.
Architect
demian/wilbur/architects
General Contractor
Ancora Construction Group
Subcontractor
All Pro Glass
Door Hardware Manufacturer
Assa Abloy

ODCA Office Construction

In January 2023, the Office of the D.C. Auditor (“ODCA”) moved into a renovated office space on the 7th and 8th floors of the National Place Building located at 1331 Pennsylvania Ave, NW. Construction of the office space began in April 2022 and was completed in December 2022. A Certificate of Occupancy was issued by the District of Columbia Department of Buildings on December 12, 2022.

The scope of the project was an interior fit-out and renovation of approximately 8,000 square feet of existing office space. The design included, but was not limited to, new interior partitions, mechanical, electrical, and plumbing (“MEP”), lighting fixtures, ceilings, and life safety devices.

The project and building owner is Quadrangle Development Corporation (“Building Owner”), who leases the office space to the Department of General Services (“DGS”). The project was designed by demian/wilbur/architects (“Architect”) and constructed by Ancora Construction Group, Inc. (“Contractor”). As part of the office renovation, new glass doors were installed in each of the interior office suites. The subcontractor responsible for the doors, frames, and hardware was All Pro Glass, LLC (“Subcontractor”). The door hardware referenced throughout the report was manufactured by Assa Abloy (“Manufacturer”).

Safety Incident in ODCA’s New Office

On January 25, 2023, a safety incident involving a senior staff member occurred in ODCA’s newly constructed office. According to ODCA personnel, the staff member sustained an injury after a component of the metal door header dislodged from its housing and fell on the staff member’s head and arm.

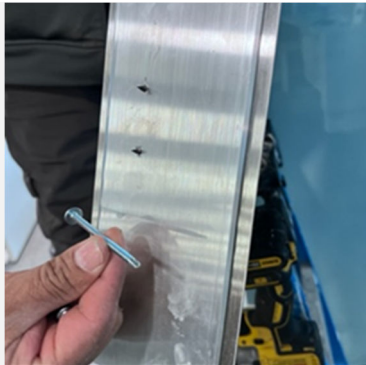
As part of the office renovation, new glass doors were installed in each of the interior office suites. Each office suite was fitted with a two-piece, snap-fit header above the glass door, which consists of a mounted housing that is mechanically fastened into the door frame (Image #1 on the following page), and a second piece that snaps into place without a fastener (Images #2 & 3). Image #6 on the following page shows the snap-fit header taped during construction. A single acting door stop (Image #4) was fastened into each two-piece header to prevent the door from opening outward into the hallway and disrupting egress routes.

During interviews, ODCA personnel noted that the snap-in piece of the header dislodged and fell from its housing as the staff member operated the door. Immediately following the incident, ODCA contacted the Contractor to notify them of the safety incident. As a result, the Contractor, in conjunction with the Subcontractor performed emergency repairs to further secure the headers. The screws used to secure the single acting door stops to the header were replaced by larger, 3-inch screws (Image #3 & 5 below). The 3-inch screws were installed to mechanically join the door stop and snap-in piece of the header to its housing and door frame above.

Interviewees noted that repairs were performed by representatives of the Contractor on January 26, 2023, and were overseen by the Subcontractor. The table on the following page includes supplementary pictures of the two-piece header, single acting door stop, and associated hardware for the interior glass office doors in ODCA’s new office.

BACKGROUND

Safety Incident in ODCA's New Office (continued)

Incident Photos		
Image #1	Image #2	Image #3
		
The image above shows the inside of the two-piece header. The piece in Image #2 & 3 is designed to snap in place and does not require exposed fasteners.	The image above shows the “snap-fit” piece of the header following the incident.	The image above shows the 3- inch screws that were installed by the Contractor, which replaced the smaller, black screws pictured.
Image #4	Image #5	Image #6
		
The image above shows the single acting door stop installed into the two-piece header.	The image above shows the original screws (right) used to fasten the single acting door stop to the two-piece header, and the 3-inch screws (left) that replaced the original.	Pre-incident photo: The image above shows the two-piece header secured by four pieces of painter's tape during construction.

BACKGROUND

Timeline of Key Events

The following table provides an overview of the key events referenced throughout the report.

Project Phase	Date	Event	Event Description
Design	February 18, 2022	Architect completes drawings	The Architect completes the construction drawings for permitting, which include the specifications for interior office doors. Refer to Appendix A for the “A601 – Door and Hardware Schedules”, and the “Door and Hardware Specifications” section of the report on page 6 & 7 for additional background.
Construction	May 5, 2022	Contractor submits Subcontractor’s product submittal package	Following review of the Architect’s plans and specifications, the Subcontractor compiles a submittal package that includes shop drawings, manufacturer specifications, and other relevant documentation for Architect approval. Refer to Appendix B for the submittal package, and the “Subcontractor’s Submittal” section of the report on page 8 for additional background.
Construction	May 9, 2022	Architect approves the Subcontractor’s submittal package	The Architect reviews the Subcontractor’s submittal package for conformance with the design intent of the contract documents. The submittal was “Approved as noted” by the Architect on May 9, 2023.
Construction	N/A	Installation of interior office doors	After approval of the submittal package, the Subcontractor begins the installation of the interior office doors.
Construction	N/A	Issues with the two-piece headers occur	During construction, interviewees observed the snap-in piece of the two-piece headers on the floor, indicating that headers may have fallen during construction.
Construction	September 2022	Initial remediation performed by Subcontractor	According to interviewees, the Subcontractor applied caulk to further secure the two-piece headers. Interviewees observed that tape was applied to the headers to hold the two components together while the caulk was drying.
Occupancy	December 12, 2022	Certificate of Occupancy	A Certificate of Occupancy for the newly constructed office is issued by the District of Columbia Department of Buildings.
Occupancy	January 25, 2023	Safety incident occurs	A safety incident involving a senior ODCA staff member occurs in Office #807.
Occupancy	January 26, 2023	Remediation of issues following safety incident	Interviewees noted that following the safety incident, the Contractor, with oversight from the Subcontractor, performed emergency repairs to all interior office doors with the two-piece headers and single acting door stops. Refer to the “Safety Incident in ODCA’s New Office” section of the report on page 3 for additional background.

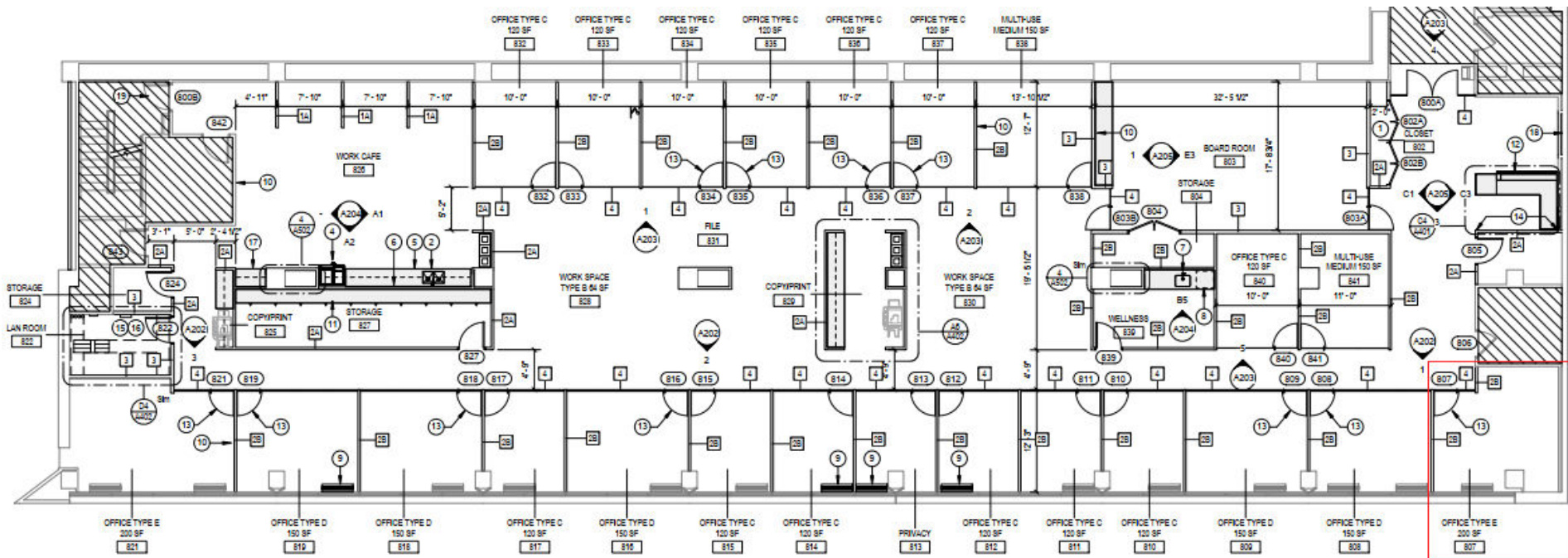
BACKGROUND

Door and Hardware Specifications

Construction specifications are documents written by architects, engineers, and designers describing how a project is to be constructed. Specifications define the products, materials, and workmanship required by the contract documents, and are commonly written in narrative form and used in conjunction with the Architect's drawings. The specifications for the interior office doors for ODCA's new office were developed by the Architect, in collaboration with the Manufacturer. During the design phase, the Architect solicited the help of the Manufacturer to create the door and hardware schedules for the project, as part of the Manufacturer's complimentary architectural services.

The Architect's drawings include the "A601 – Door and Hardware Schedules" document [Appendix A], which defines the type of door and hardware to be used for each office type. As shown in Figure 1 below, the safety incident occurred on the 8th floor of the building, in Office #807. According to the Architect's "Door and Frame Schedule", the design specified a "Type 2" door, with hardware from Hardware Set #2 for Office #807 (shown in Figure 2 on the following page).

Figure 1: Level 8 Partition Plan, Permit Drawings dated February 18, 2022.



BACKGROUND

Door and Hardware Specifications (continued)

As shown in Figure 2 below, the hardware schedule within the Architect's drawings included eight (8) total hardware components for Hardware Set #2. Notably, the specifications did not include the two-piece header, or the single acting door stop installed in Office #807.

Figure 2: Hardware Set Schedule, A601 – Door and Hardware Schedules, Permit Drawings dated February 18, 2022.

HARDWARE SET SCHEDULE				
SET	ITEM	MANUFACTURER	MODEL NUMBER	FINISH
1	INT. GLASS PAIR-CARD READER/ELECTRIC STRIKE/CONCEALED CLOSER/STOP			
	2 BOTTOM PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-10A	US32D
	2 TOP PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-20A	US32D
	2 PIVOT	ASSA ABLOY GLASS SOLUTIONS	PF-ADJ-PIVOT	US32D
	1 GLASS EXIT DEVICE...	ASSA ABLOY GLASS SOLUTIONS	PDU8000-3 Code 04	US32D
	1 GLASS EXIT DEVICE (NON KEYED)	ASSA ABLOY GLASS SOLUTIONS	PDU8000-3 Non-Keyed	US32D
	1 CYLINDER		MATCH/EXPAND FACILITY...	
	1 ELECTRIC STRIKE	ASSA ABLOY GLASS SOLUTIONS	ESK-DBL-24D	US32D
	2 CONCEALED CLOSER	ASSA ABLOY GLASS SOLUTIONS	OHC-609-105NHO	
	2 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)...	US26D
	1 CARD READER		PROVIDED BY SECURITY...	
	2 MOTION SENSOR	ASSA ABLOY GLASS SOLUTIONS	MAG-XMS	WHITE
	1 POWER SUPPLY	ASSA ABLOY GLASS SOLUTIONS	PS-AQDXX (TO SUIT)	
	1 WIRING DIAGRAM		ELEVATION AND POINT TO POINT AS SPECIFIED.	
	Notes: • Electronic Operation: Valid card releases electric strike or key retracts latchbolt. Request to exit shows authorized egress. • Free egress at all times. In case of power loss, door remains locked and latched. • Balance of hardware by glass door supplier.			
2	INTERIOR GLASS - LOCKING PULL/CONCEALED CLOSER/STOP			
	1 BOTTOM PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-10A	US32D
	1 TOP PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-20A	US32D
	1 PIVOT	ASSA ABLOY GLASS SOLUTIONS	PF-ADJ-PIVOT	US32D
	1 CYLINDER		MATCH/EXPAND FACILITY...	
	1 DUST PROOF STRIKE	ASSA ABLOY GLASS SOLUTIONS	570	US26D
	1 LOCKING PULL	ASSA ABLOY GLASS SOLUTIONS	LP3301FHD ADA	US32D
	1 CONCEALED CLOSER	ASSA ABLOY GLASS SOLUTIONS	OHC-609-90NHO	
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D
	Notes: Balance of hardware by glass door supplier.			

BACKGROUND

Construction Submittal Process

A construction submittal is a package of information provided by a contractor to an architect or owner for review and approval. As part of the submittal process, the architect reviews the contractor's submittal for conformance with the design intent, specifications, and contract documents. Submittals can vary in content and structure depending on the type of project, scope of work, or trade. A submittal may contain shop drawings (i.e., drawings, diagrams, and other information prepared by the contractor), product data (i.e., technical product sheets, illustrations, brochures, and other information provided by manufacturers), and mock-ups or samples (i.e., physical examples of the proposed product or construction component).

The contractor must demonstrate through their submittal that the proposed plans, products, and materials agree to the contract documents. The architect and/or project team will review the contractor's submission, and either approve or reject the submittal. Submittals may be approved with additional comments or notes from the Architect, and may undergo several rounds of "revise and resubmit" before approval.

Subcontractor's Submittal: Glazing Walls and Hardware

On May 9, 2022, the Architect approved the Subcontractor's "Glazing Walls and Glazing Hardware Submittal" [Appendix B] containing the products and hardware proposed by the Subcontractor for the installation of the interior office doors. The Subcontractor's submittal included two (2) additions and one (1) substitution to/from the Architect's door and hardware schedules. The following products were not included in the specifications, or were substituted by the Contractor:

Additions:

- Two-Piece 1-3/4" x 4-1/2" Glass Header (HDR-1750x4500)
- DS-3000 Single Acting Door Stop

Substitutions:

- PFD-22 w/OHC Closer Insert (substitution for PFD-20A)

RSM reviewed the product sheets provided for the two-piece header and single acting door stops, in addition to the resources provided on the Manufacturer's website, and noted that detailed installation instructions for the two-piece header and single acting door stop were not available.



Figure 3: Diagram of Office #807

CONCLUSIONS

As part of our analysis, we noted the following key takeaways:

Design & Construction of Interior Office Doors

RSM noted that the products included in the Subcontractor's "Glazing Walls and Glazing Hardware Submittal" [Appendix B] appeared to align with the door and hardware schedules included in the Architect's drawings, and that additions/substitutions submitted by the Contractor were approved by the Architect.

We compared the Architect's "A601 – Door and Hardware Schedules" to the Subcontractor's "Glazing Walls and Glazing Hardware Submittal". Notably, the two-piece header and single acting door stop were not included in the specifications; however, these products were approved by the Architect as part of the Subcontractor's submittal.

RSM conducted an interview with the Architect, who noted that substitutions and additions are common practice during the submittal process, and that the hardware schedule included in the specifications was intended as a general guide. As further support, we also noted the specifications provided to the Architect by the Manufacturer included the following language:

"The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process."

In addition, RSM inquired with the Contractor to gain an understanding of how the decision was made to add the single acting door stop. According to the Contractor, the door stop was added to the two-piece header to prevent the office doors from opening into the hallway, which may have impeded egress routes. RSM reviewed the District of Columbia Building Code, *Chapter 10: Means of Egress*, and noted that the Contractor's comments appeared consistent with the guidance provided within that section of the Code.

Contractor/Subcontractor Remediation Efforts

During interviews, stakeholders noted that potential issues related to the two-piece headers were identified during construction, prior to the January 2023 safety incident. In addition to the information provided in interviews, issues related to door and hardware installation were documented in punchlists generated by the Architect on October 18, 2022, December 1, 2022, and December 5, 2022. Those who would have received the punchlists include the Contractor, Building Owner, Architect, and the Department of General Services. Interviewees noted that ad-hoc remediation efforts were conducted by the Subcontractor during construction, including the use of caulk to further secure the "snap-in" piece of the headers. Immediately following the incident, the Contractor, with oversight from the Subcontractor, performed emergency repairs to mechanically secure the two-piece header.

According to interviewees, the Contractor and/or Subcontractor did not contact the Manufacturer for recommended remediation steps at any point during construction or repair. Through review of the Manufacturer's website and discussion with various technical support representatives, we noted that online resources and product support are available to the public. The Manufacturer offers product support for each of their service lines and associated brands, in addition to complimentary architectural services and submittal review. Considering the resources available, the Manufacturer could have provided additional guidance following the initial identification of issues with the two-piece headers, prior to the January 2023 safety incident.

CONCLUSIONS

Contractor/Subcontractor Remediation Efforts (continued)

As part of our analysis, RSM inquired with the Manufacturer's technical support team to determine whether issues with the two-piece headers and single acting door stops have occurred. While we did not discuss ODCA's new office construction, or the safety incident that occurred in January 2023, we presented a hypothetical scenario to obtain additional information. During our discussion, a technical support representative acknowledged that the snap-in piece of the header could dislodge if pressure is applied to the door stop, and further, that instances of this example were known to have occurred.

Technical support also noted that a solid, one-piece header is preferred over the two-piece header to prevent this issue; however, the two-piece header could be secured using a "blocking" method, in which the door stop and snap-in header is mounted to an aluminum extrusion or a piece of wood within the header. RSM also inquired about the Contractor's method of repair following the safety incident (refer to page 3 for additional information regarding repairs). The technical support representative noted that while the method of repair could be a viable solution, the method used would leave unsupported area within the header without blocking.

Recommendations

In our discussions with the Architect, Contractor, and Building Owner, these parties indicated that the remediation efforts performed by the Contractor are sufficient to mitigate the risk of further safety incidents involving the two-piece headers. However, considering the recommendations provided by the Manufacturer as a result of our inquiry, ODCA may consider obtaining additional guidance from the Manufacturer to confirm that the remediation measures implemented by the Contractor are sufficient, potential safety hazards have been mitigated, and no further repair is necessary.

OBJECTIVES AND APPROACH

The primary objective of the engagement was to gain an understanding of the safety incident that occurred on January 25, 2023, and the issues related to the interior office doors installed as part of ODCA's new office construction. Evaluation of the technical aspects of the failures falls outside of our expertise as internal auditors and the scope of our engagement.

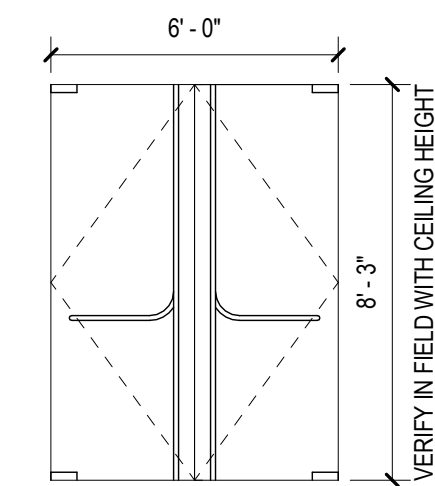
The internal audit was performed in accordance with the scope and approach set forth in our Consulting Services Agreement, dated February 23, 2023, and was limited to the procedures therein. Our approach consisted of the following:

- Conducted interviews with stakeholders to gain an understanding of key events related to the ODCA's new office construction
- Obtained and reviewed the design agreement and prime construction agreement
- Obtained and reviewed scoping documents, specifications, and other documentation
- Obtained and reviewed product submittals for interior office doors and related components
- Obtained and reviewed manufacturer installation manuals for interior office doors and related components
- Documented key provisions and specifications related to the interior office door systems installed in the ODCA office
- Performed a comparison of the Architect's specifications and the Subcontractor's product submittal for doors and hardware
- Conducted visual inspection of interior office door systems through review of photo documentation and on-site walkthroughs

At the conclusion of our procedures, we summarized our findings into a written report, which was reviewed with the Office of the D.C. Auditor in June 2023.

APPENDIX A

DOOR AND FRAME SCHEDULE										
Mark	DOOR			DOOR SLAB MATERIAL	DOOR SLAB FINISH	FRAME TYPE	DOOR FRAME MATERIAL	DOOR FRAME FINISH	Hardware Set	Notes
	Type Mark	Width	Size Height Thickness							
700A	1	6'-0"	8'-3" 0'-0 3/4"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	1	
700B	3	3'-0"	8'-3" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	4	
701A	5	6'-0"	8'-0" 0'-1 3/4"	SCWD	P4	CASED OPENING	NA	NA	10	
701B	6	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	CASED OPENING	NA	P3	11	
702	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
703	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
704	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
705	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
706	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
707	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
708	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
709	3	5'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	8	
710	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
711A	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
711B	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
713	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	4	
800A	1	6'-0"	8'-0" 0'-0 3/4"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	1	
802A	2	5'-0"	8'-0" 0'-1 3/4"	SCWD	P4	CASED OPENING	NA	NA	10	
802B	2	5'-0"	8'-0" 0'-1 3/4"	SCWD	P4	CASED OPENING	NA	NA	10	
803A	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
803B	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
804	4	6'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	8	
805	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	5	
807	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
808	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
809	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
810	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
811	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
812	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
813	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
814	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
815	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
816	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
817	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
818	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
819	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
821	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
822	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	4	
824	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	5	
827	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	4	
832	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
833	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
834	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
835	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
836	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
837	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	2	
838	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
839	3	3'-0"	8'-0" 0'-1 3/4"	SCWD	P4	HMKD	HOLLOW METAL	P3	7	DOOR TO HAVE OCCUPANCY INDICATOR AND KEY OVERRIDE
840	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	
841	2	3'-0"	8'-3" 0'-0 1/2"	TEMPERED GLASS	CLEAR	FRAMELESS	NA	NA	3	



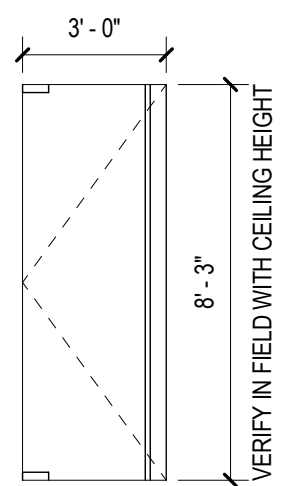
TYPE 1:
FRAMELESS GLASS DOUBLE
DOOR

BLUMCRAFT H-100-F PANIC
HARDWARE GLASS MOUNT
WITH DB-100-F DEADBOLT
HOUSING, AND DH-100-F
DUMMY HANDLE GLASS
MOUNT

DORMA UNIVERSAL PATCH
FITTING PT 20 BOTTOM
PATCH

DORMA UNIVERSAL PATCH
FITTING PT 22 TOP PATCH

DORMA RTS 88 OVERHEAD
CONCEALED CLOSER



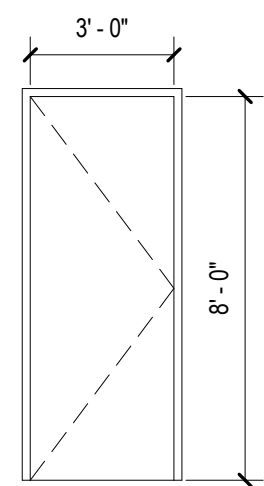
TYPE 2:
3/4" THICK TEMPERED
GLASS INTERIOR DOOR

BLUMCRAFT DB-100-F
DEADBOLT
HOUSING/DH-100-F DUMMY
HANDLE GLASS MOUNT

DORMA UNIVERSAL PATCH
FITTING PT 20 BOTTOM
PATCH

DORMA UNIVERSAL PATCH
FITTING PT 22 TOP PATCH

DORMA RTS 88 OVERHEAD
CONCEALED CLOSER



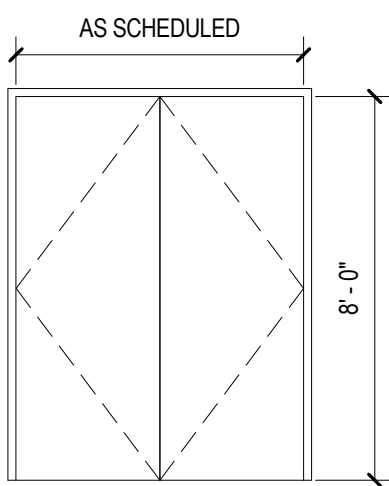
TYPE 3:
SOLID CORE WOOD
DOOR

3'-0" X 8'-0" X 1 3/4" FLUSH
PANEL SOLID CORE WOOD
DOOR

FACE CONSTRUCTION 5-PLY
PLAIN SLICED VENEER
CENTER BALANCED BOOK
MATCHED SUITABLE FOR
TRANSPARENT FINISH.
FACTORY MACHINED FOR
HARDWARE AS SCHEDULED.

HOLLOW METAL KNOCK
DOWN FRAME

SHOP FABRICATED 2" 16 GA.
STEEL FRAME TO MATCH
WALL THICKNESS. MINIMUM
7 GA. REINFORCEMENT AT
HINGES, CLOSER AND DOOR
STRIKE MORTISE. FACTORY
PRIMED/ PAINT P-7 WITH
SEMI-GLOSS FINISH.



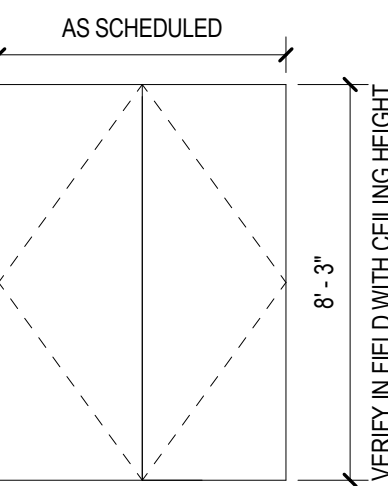
TYPE 3:
SOLID CORE WOOD DOUBLE
DOOR

3'-0" X 8'-0" X 1 3/4" FLUSH
PANEL SOLID CORE WOOD
DOOR

FACE CONSTRUCTION 5-PLY
PLAIN SLICED VENEER
CENTER BALANCED BOOK
MATCHED SUITABLE FOR
TRANSPARENT FINISH.
FACTORY MACHINED FOR
HARDWARE AS SCHEDULED.

HOLLOW METAL KNOCK
DOWN FRAME

SHOP FABRICATED 2" 16 GA.
STEEL FRAME TO MATCH
WALL THICKNESS. MINIMUM
7 GA. REINFORCEMENT AT
HINGES, CLOSER AND DOOR
STRIKE MORTISE. FACTORY
PRIMED/ PAINT P-7 WITH
SEMI-GLOSS FINISH.



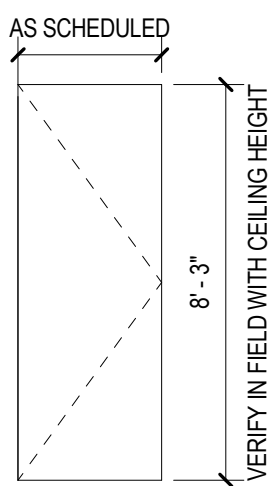
TYPE 5:
SOLID CORE WOOD DOUBLE
DOOR WITH CASED
OPENING

6'-0" X 8'-3" X 1 3/4" FLUSH
PANEL SOLID CORE WOOD
DOOR

FACE CONSTRUCTION 5-PLY
PLAIN SLICED VENEER
CENTER BALANCED BOOK
MATCHED SUITABLE FOR
TRANSPARENT FINISH.
FACTORY MACHINED FOR
HARDWARE AS SCHEDULED.

HOLLOW METAL KNOCK
DOWN FRAME

SHOP FABRICATED 2" 16 GA.
STEEL FRAME TO MATCH
WALL THICKNESS. MINIMUM
7 GA. REINFORCEMENT AT
HINGES, CLOSER AND DOOR
STRIKE MORTISE. FACTORY
PRIMED/ PAINT P-7 WITH
SEMI-GLOSS FINISH.



TYPE 6:
SOLID CORE WOOD SINGLE
DOOR WITH CASED
OPENING

3'-0" X 8'-3" X 1 3/4" FLUSH
PANEL SOLID CORE WOOD
DOOR

FACE CONSTRUCTION 5-PLY
PLAIN SLICED VENEER
CENTER BALANCED BOOK
MATCHED SUITABLE FOR
TRANSPARENT FINISH.
FACTORY MACHINED FOR
HARDWARE AS SCHEDULED.

HOLLOW METAL KNOCK
DOWN FRAME

SHOP FABRICATED 2" 16 GA.
STEEL FRAME TO MATCH
WALL THICKNESS. MINIMUM
7 GA. REINFORCEMENT AT
HINGES, CLOSER AND DOOR
STRIKE MORTISE. FACTORY
PRIMED/ PAINT P-7 WITH
SEMI-GLOSS FINISH.

HARDWARE SET SCHEDULE					
SET	ITEM	MANUFACTURER	MODEL NUMBER	FINISH	
1	INT. GLASS PAIR-CARD READER/ELECTRIC STRIKE/CONCEALED CLOSER/STOP				
	2 BOTTOM PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-10A	US32D	
	2 TOP PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-20A	US32D	
	2 PIVOT	ASSA ABLOY GLASS SOLUTIONS	PF-ADJ-PIVOT	US32D	
	1 GLASS EXIT DEVICE...	ASSA ABLOY GLASS SOLUTIONS	PDU8000-3 Code 04	US32D	
	1 GLASS EXIT DEVICE (NON KEYED)	ASSA ABLOY GLASS SOLUTIONS	PDU8000-3 Non-Keyed	US32D	
	1 CYLINDER	ASSA ABLOY GLASS SOLUTIONS	MATCH/EXPAND FACILITY...		
	1 ELECTRIC STRIKE	ASSA ABLOY GLASS SOLUTIONS	ESK-DBL-24D	US32D	
	2 CONCEALED CLOSER	ASSA ABLOY GLASS SOLUTIONS	OHC-609-105NHO		
	2 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)...	US26D	
	1 CARD READER	ASSA ABLOY GLASS SOLUTIONS	PROVIDED BY SECURITY...		
2 MOTION SENSOR	ASSA ABLOY GLASS SOLUTIONS	MAG-XMS	WHITE		
1 POWER SUPPLY	ASSA ABLOY GLASS SOLUTIONS	PS-AQDXX (TO SUIT)			
1 WIRING DIAGRAM		ELEVATION AND POINT TO POINT AS SPECIFIED.			
Notes: • Electronic Operation: Valid card releases electric strike or key retracts latchbolt. Request to exit shows authorized egress. • Free egress at all times. In case of power loss, door remains locked and latched. • Balance of hardware by glass door supplier.					
INTERIOR GLASS - LOCKING PULL/CONCEALED CLOSER/STOP					
2	1 BOTTOM PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-10A	US32D	
	1 TOP PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-20A	US32D	
	1 PIVOT	ASSA ABLOY GLASS SOLUTIONS	PF-ADJ-PIVOT	US32D	
	1 CYLINDER	ASSA ABLOY GLASS SOLUTIONS	MATCH/EXPAND FACILITY...		
	1 DUST PROOF STRIKE	ASSA ABLOY GLASS SOLUTIONS	570	US26D	
	1 LOCKING PULL	ASSA ABLOY GLASS SOLUTIONS	LP3301FHD ADA	US32D	
	1 CONCEALED CLOSER	ASSA ABLOY GLASS SOLUTIONS	OHC-609-90NHO		
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
	Notes: Balance of hardware by glass door supplier.				
	INTERIOR GLASS-PULL /PULL/CONCEALED CLOSER/STOP				
	3	1 BOTTOM PATCH	ASSA ABLOY GLASS SOLUTIONS	PFD-10A	US32D
1 TOP PATCH		ASSA ABLOY GLASS SOLUTIONS	PFD-20A	US32D	
1 PIVOT		ASSA ABLOY GLASS SOLUTIONS	PF-ADJ-PIVOT	US32D	
2 DOOR PULL		ASSA ABLOY GLASS SOLUTIONS	RM3301 MTG-TYPE 13HD	US32D	
1 CONCEALED CLOSER		ASSA ABLOY GLASS SOLUTIONS	OHC-609-90NHO		
1 DOOR STOP		ROCKWOOD	403/441CU (TO SUIT)	US26D	
Notes: Balance of hardware by glass door supplier.					
INTERIOR - CARD READER/ELECTRIC STRIKE					
4 HINGE, FULL MORTISE HEAVY WT		MCKINNEY	T4A3786	US26D	
1 STOREROOM LOCK		CORBIN RUSSWIN	ML2057 110T LC	626	
1 CYLINDER			MATCH/EXPAND FACILITY...		
1 ELECTRIC STRIKE	HES	1600	630		
1 SMART PAC BRIDGE RECTIFIER	HES	2005M3			
1 SURFACE CLOSER	CORBIN RUSSWIN	DC6200/DC6210 (TO SUIT)	626		
1 KICK PLATE	ROCKWOOD	K1050 10" CSK	US32D		
3 SILENCER	ROCKWOOD	608/609 (TO SUIT)			
1 CARD READER		PROVIDED BY SECURITY...			
1 DOOR POSITION SWITCH	SECURITRON	DPS2-MW-BK			
1 REQUEST TO EXIT	SECURITRON	XMS			
1 POWER SUPPLY	SECURITRON	AQDXX (TO SUIT)			
1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26 D		
Notes: •Electronic Operation: Valid card releases electric strike or key retracts latchbolt. Request to exit shows authorized egress. Free egress at all times. In case of power loss, door remains locked and latched.					
INTERIOR STORAGE					
5	4 HINGE, FULL MORTISE HEAVY WT	MCKINNEY	T4A3786	US26D	
	1 STOREROOM LOCK	CORBIN RUSSWIN	ML2057 110T LC	626	
	1 CYLINDER		MATCH /EXPAND FACILITY...		
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
	3 SILENCER	ROCKWOOD	608/609 (TO SUIT)		
	INTERIOR PRIVACY				
	4 HINGE, FULL MORTISE HEAVY WT	MCKINNEY	T4A3786	US26D	
	1 PRIVACY LOCK	CORBIN RUSSWIN	TL3720 110T	626	
	1 KICK PLATE	ROCKWOOD	K1050 10" CSK	US32D	
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
3 SILENCER	ROCKWOOD	608/609 (TO SUIT)			
7	INTERIOR PRIVACY WITH OCCUPANCY INDICATOR				
	4 HINGE, FULL MORTISE HEAVY WT	MCKINNEY	T4A3786	US26D	
	1 PRIVACY LOCK	CORBIN RUSSWIN	ML2060 110T V21	626	
	1 KICK PLATE	ROCKWOOD	K1050 10" CSK	US32D	
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
	3 SILENCER	ROCKWOOD	608/609 (TO SUIT)		
	INTERIOR PAIR CLOSET				
	8 HINGE, FULL MORTISE	MCKINNEY	TA2714	US26D	
	2 HALF DUMMY TRIM	CORBIN RUSSWIN	TL3750 110T	626	
	2 ROLLER LATCH	ROCKWOOD	592	US26D	
2 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D		
2 SILENCER	ROCKWOOD	608/609 (TO SUIT)			
9	INTERIOR CLOSET				
	4 HINGE, FULL MORTISE HEAVY WT	MCKINNEY	TA2714	US26D	
	1 HALF DUMMY TRIM	CORBIN RUSSWIN	TL3750 110T	626	
	1 ROLLER LATCH	ROCKWOOD	592	US26D	
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
	2 SILENCER	ROCKWOOD	608/609 (TO SUIT)		
	INTERIOR CLOSET PAIR OFFSET PIVOTS-CASED OPENING				
	2 OFFSET TOP AND BOTTOM...	RIXSON	MODEL 147 OFFSET PIVOT SET	626	
	2 INTERMEDIATE OFFSET PIVOT	RIXSON	M19	626	
	2 HALF DUMMY TRIM	CORBIN RUSSWIN	TL3750 110T	626	
2 ROLLER LATCH	ROCKWOOD	592	US26D		
2 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D		
2 SILENCER	ROCKWOOD	608/609 (TO SUIT)			
11	INTERIOR CLOSET OFFSET PIVOTS CASED OPENING				
	1 OFFSET TOP AND BOTTOM...	RIXSON	MODEL 147 OFFSET PIVOT SET	626	
	1 INTERMEDIATE OFFSET PIVOT	RIXSON	M19	626	
	1 HALF DUMMY TRIM	CORBIN RUSSWIN	TL3750 110T	626	
	1 ROLLER LATCH	ROCKWOOD	592	US26D	
	1 DOOR STOP	ROCKWOOD	403/441CU (TO SUIT)	US26D	
	1 SILENCER	ROCKWOOD	608/609 (TO SUIT)		



APPENDIX B





ALL PRO • ALL QUALITY • ALL THE TIME

5650 B Third street NE Washington DC 20111
5532 Tuxedo Road, Hyattsville, MD 20781
CBE Washington DC - MBE Baltimore City - MDOT Maryland

April 27th, 2022

Ancora Construction Group
8605 Westwood Center Drive Suite 400
Vienna, VA 22182
Attn: Aubrey D. Skinner

Phone: 540 771 0436

Project: ODCA 7th & 8th Floor
Location: Washington DC
Architect: Demian / Wilbur / Architects
Submittal prepared by Leopole Tandjong

ALL GLASS WALL SUBMITTAL

1/2" Clear tempered Glass with top and bottom channels

- 1" x 1 3/4" top channel
- 1" x 1" bottom channel
- Finish: US32D



ALL PRO • ALL QUALITY • ALL THE TIME

5650 B Third street NE Washington DC 20111
5532 Tuxedo Road, Hyattsville, MD 20781
CBE Washington DC - MBE Baltimore City - MDOT Maryland

April 27th, 2022

Ancora Construction Group
8605 Westwood Center Drive Suite 400
Vienna, VA 22182

Attn: Aubrey D. Skinner

Phone: 540 771 0436

Project: ODCA 7th & 8th Floor
Location: Washington DC
Architect: Demian / Wilbur / Architects
Submittal prepared by Leopole Tandjong

ALL GLASS DOORS HARDWARE SUBMITTAL

½" Clear tempered All Glass doors with Hardware

CONTRACTOR RESPONSIBLE FOR VERIFYING ALL GLASS
DOOR HEIGHTS WITH FINISHED CEILING HEIGHTS PRIOR
TO MATERIAL ORDER.

VERIFY IN FIELD

PAIRS: DOORS 700A, 800A (6'0" X 8' 3") HARDWARE SET 1 All Glass Door

ITEM	MANUFACT.	PART	QTY	Finish
Header	Glass Solutions	HDS -1750X4500 1 3/4" x 4 1/2" prepped for Exit Device	2	US32D
Bottom Rail	Glass Solutions	DRT-4DF-B 4" tapered bottom rail prepped w/PV FM 300 end load bottom pivot	4	US32D
Top Rail	Glass Solutions	DRT-4DF-T 4" tapered top rail prepped for panic	4	US32D
Glass Exit Device	Glass Solutions	PDU 8000-3 Code 04 w/ temporary cylinder	2	US32D
Glass Exit Device (Not keyed)	Glass Solutions	PDU-8000-3 Non keyed	2	US32D
Electric Strike	Glass Solutions	ESK-DBL-24D	2	US32D
Concealed Closers	Glass Solutions	OHC-304-105NHO	4	
Door Stop	Rockwood	403/441CU	4	US26D

Please note that because of the exit device, doors must have top/bottom rails

Approved

Due to the weight of the door, 304 closer is used in lieu of 609

Approved

Motion Sensor , Power supply and Card Reader will be provided by Security Vendor

VERIFY IN FIELD

SINGLES: DOORS 708, 807, 808, 809, 816, 818, 819, 821, 834, 835, 836, 837 (3'0" X 8' 3") HARDWARE SET 2 All Glass Door

ITEM	MANUFACT.	PART	QTY	Finish
Header		HDS -1750X4500 1 3/4" x 4 1/2" 2 pcs standard header	12	US32D
Bottom Patch fitting	Glass Solutions	PFD-10	12	US32D
Top Patch fitting	Glass Solutions	PFD-22 w/OHC closer insert	12	US32D
Pivot	Glass Solutions	PF-ADJ-Pivot	12	US32D
Dust Proof Strike	Glass Solutions	570	12	US26D
Locking Pulls	Glass Solutions	LP3301FHD ADA w/ cylinder	12	US32D
Concealed Closers	Glass Solutions	OHC-609-90NHO	12	
Door Stop	Rockwood	403/441CU	12	US26D

closer to have hold open function

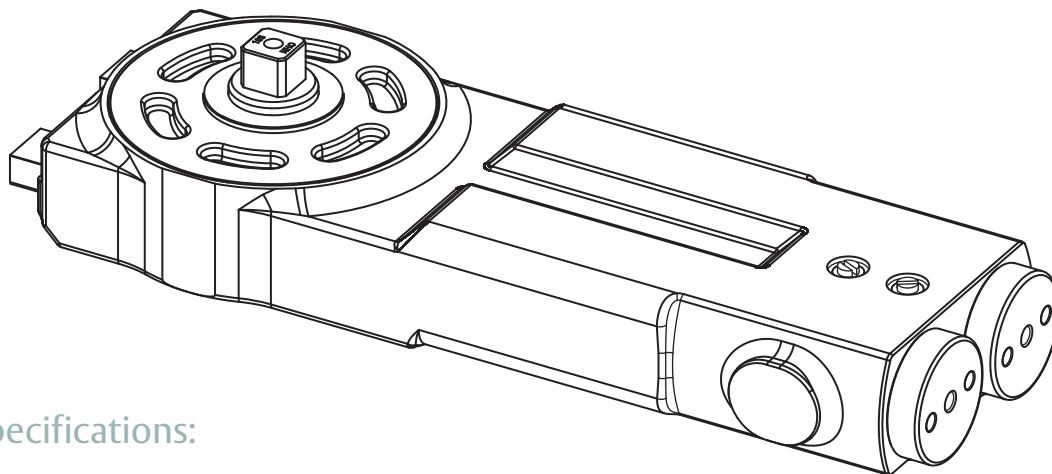
SINGLES: DOORS 702, 703, 704, 705, 706, 707, 710, 711A, 711B, 803A, 803B, 810, 811, 812, 813, 814, 815, 817, 832, 833, 838, 840, 841
(3'0" X 8' 3") HARDWARE SET 3 All Glass Door

ITEM	MANUFACT.	PART	QTY	Finish
Header		HDS -1750X4500 1 3/4" x 4 1/2" 2 pcs standard header	23	US32D
Bottom Patch fitting	Glass Solutions	PFD-10	23	US32D
Top Patch fitting	Glass Solutions	PFD-22 w/OHC closer insert	23	US32D
Pivot	Glass Solutions	PF-ADJ-Pivot	23	US32D
Door Pull	Glass Solutions	RM3301 84" BTB pulls	23	US32D
Concealed Closers	Glass Solutions	OHC-609-90NHO	23	
Door Stop	Rockwood	403/441CU	23	US26D

↑
 closer to have hold open function

Experience a safer
and more open world

OHC-304 Heavy Duty Overhead Concealed Door Closer



Specifications:

MATERIAL:

Cast Iron Closer Body
Radial Ball Bearing Bottom Pivot

SYSTEM INCLUDES:

- 5mm Extended Spindle
- Spring Size 4

HOLD OPEN OPTIONS:

- 90° Back Stop, Non-Hold Open (OHC-304-90NHO)
- 90° Back Stop, Hold Open (OHC-304-90HO)
- 105° Back Stop, Non-Hold Open (OHC-304-105NHO)
- 105° Back Stop, Hold Open (OHC-304-105HO)

**Use an auxiliary stop with OHC-304.*

ACCESSORY OPTIONS:

- Door Rail End Load Bottom Pivot (PV-FM-300END)
- Patch Fitting Floor Mounted Pivot (PF-FM-PIVOT)
- Patch Fitting Adjustable Pivot (PF-ADJ-PIVOT)
- Mounting Clips (OHC-609-MC)
- Center Hung End Load Closer Arm (OHC-609-ARM)

Key Dimensions:

MAXIMUM
DOOR WEIGHT:
Interior: 300 lbs.
Exterior: 250 lbs.

MAXIMUM
DOOR WIDTH:
Interior: 48"
Exterior: 42"

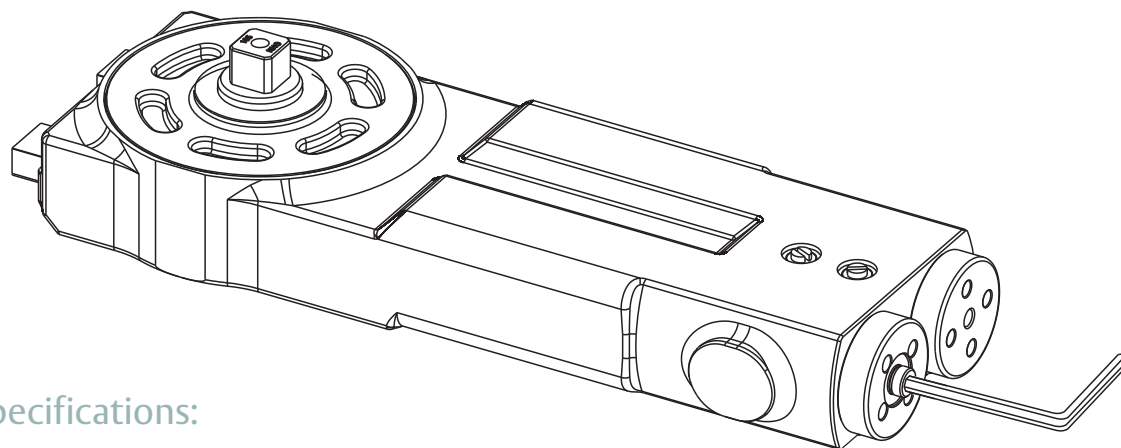
APPROVALS
AND LISTINGS:
- Meets ANSI/BHMA
Standard A156.4
Grade 1
- UL228

ASSA ABLOY Opening Solutions
Glass Solutions
Rockwood, PA
P: 855.594.6989 • F: 844.851.8665
www.assaabloyglass.us
Orders.GlassSolutions@assaabloy.com • TechSupport.GlassSolutions@assaabloy.com

ASSA ABLOY Door Security Solutions
Vaughan, ON L4K 4T9
P: 800.461.3007
www.assaabloydss.ca

The global leader in
door opening solutions

609 Overhead Concealed Door Closer



Specifications:

MATERIAL:

Cast Iron Closer Body

SYSTEM INCLUDES:

- 5mm Extended Spindle
- Adjustable Spring Size 1-3
- Separate Closing and Latching Valves

HOLD OPEN OPTIONS:

- 90° Back Stop, Non-Hold Open (OHC-609-90NHO)
- 90° Back Stop, Hold Open (OHC-609-90HO)
- 105° Back Stop, Non-Hold Open (OHC-609-105NHO)
- 105° Back Stop, Hold Open (OHC-609-105HO)

*Use an auxiliary stop with OHC-609.

Interior Offices and
Meeting rooms to have
hold open function.

ACCESSORY OPTIONS:

- Door Rail Adjustable End Load Bottom Pivot (PV-ENDLOAD)
- Patch Fitting Floor Mounted Pivot (PF-FM-PIVOT)
- Patch Fitting Adjustable Pivot (PF-ADJ-PIVOT)
- Mounting Clips (OHC-609-MC)
- Center Hung End Load Closer Arm (OHC-609-ARM)

Key Dimensions:

MAXIMUM
DOOR WEIGHT:
200 lbs.

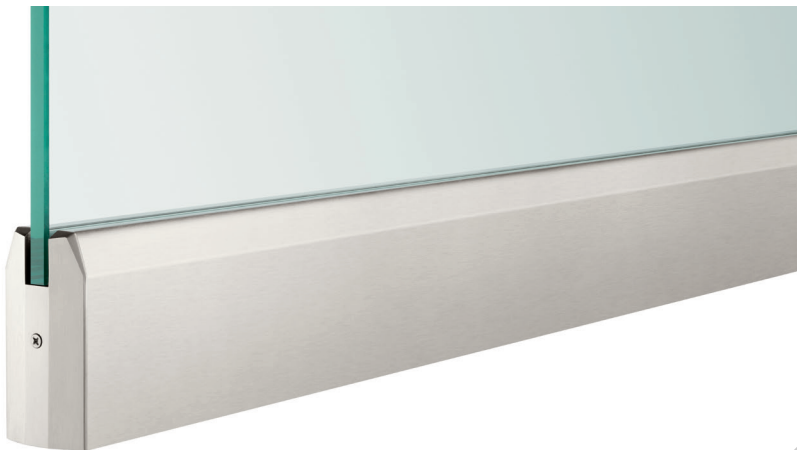
MAXIMUM
DOOR WIDTH:
Interior: 42"
Exterior: 36"

APPROVALS
AND LISTINGS:
- ANSI/BHMA
Standard A156.4
Grade 1
- Barrier free
operation to com-
ply with Federal
Accessibility
Standards (ADA);
complying with
ANSI A117.1 with
center pivoted
applications

300 Main Street
Rockwood, Pennsylvania 15557
P: 855.594.6989 • F: 844.851.8665
www.assaabloyglass.us
Orders.GlassSolutions@assaabloy.com • TechSupport.GlassSolutions@assaabloy.com

Experience a safer
and more open world

DRT-4 Tapered Door Rail



Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314
- 314E
- BSP
(Black Suede Powder Coat)
- WSP
(White Suede Powder Coat)

GLASS THICKNESS

$\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{9}{16}$ ",
 $\frac{5}{8}$ ", $\frac{11}{16}$ ", $\frac{3}{4}$ "

HEIGHT

4"

Specifications:

MATERIAL:

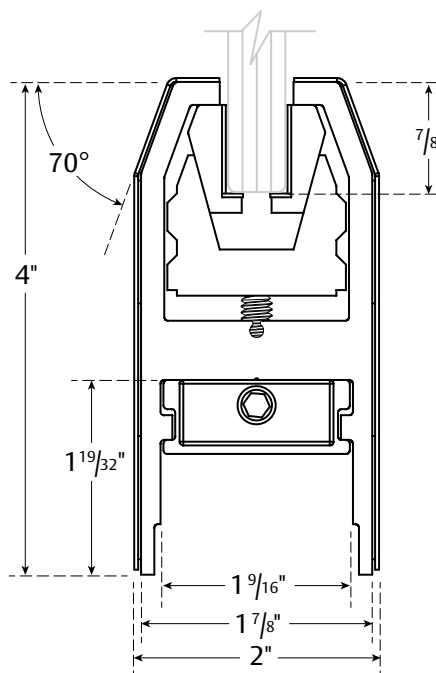
Aluminum Body, Bright or Satin Stainless Steel Cladding

FEATURES:

Lateral Adjustable Blocking. Wedge clamping system for easy installation.

OPTIONS:

Fabricated and supplied with standard closer or pivot components and deadbolt lock. Custom fabrication for competitor's hardware available upon request (consult factory for compatibility).



300 Main Street
Rockwood, Pennsylvania 15557
P: 855.594.6989 • F: 844.851.8665
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Orders.GlassSolutions@assaabloy.com • TechSupport.GlassSolutions@assaabloy.com

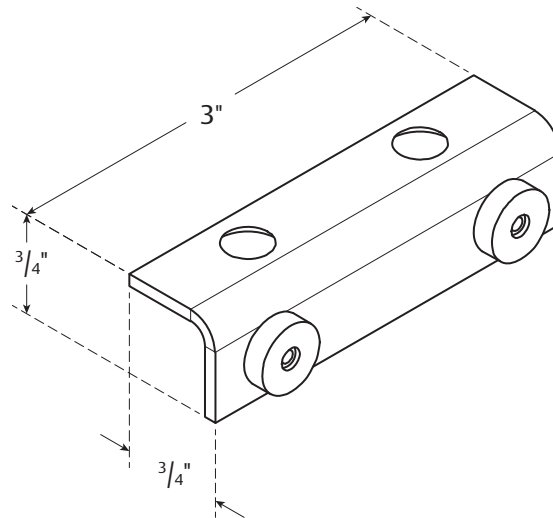
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DS-3000 Single Acting Door Stop



Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314E
- BSP
(Black Suede
Powder Coat)
- WSP
(White Suede
Powder Coat)
- Stock Powder
Coats



Specifications:

MATERIAL:

Aluminum and Stainless Steel

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Canada:
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P: 800.461.3007
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ESK-DBL



Available Finishes:

- US32D/630
- US32/629
- 314E
- 10BE/Stock Powder Coats
- BSP (Black Suede Powder Coat)
- WSP (White Suede Powder Coat)

Specifications:

FEATURES:

The HES Folger Adam 310-1 ($\frac{3}{4}$) is an industrial grade electric strike designed specifically for use in glass door applications with addition of a strike plate. The stainless steel construction makes it ideal for strength and corrosion resistance.

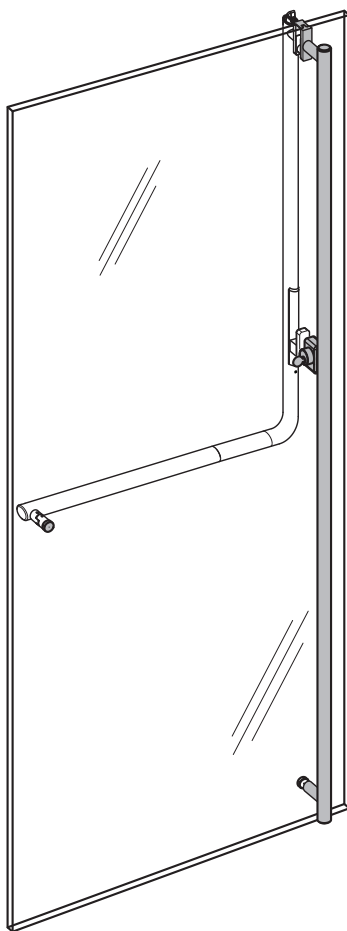
OPTIONS:

Latchbolt Monitoring (LCBMA): Sends signal to access control system when latchbolt is disengaged.

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Panic Device PDU8000-3 (Full-Height Straight Pull)



**PLEASE SPECIFY
ENGRAVING
OPTION**

BLACK

Specifications:

MATERIAL:
Stainless Steel

FUNCTIONS:

- Keyed
- Passage (dogging standard)

GLASS THICKNESS:

- 1/2" to 3/4" thick standard.
- Non-standard thickness, specify.

APPLICATIONS:

- Glass mounted
- Rail mounted

HANDING:

- Right-hand reverse (swing 3)
- Left-hand reverse (swing 4)

Certifications:
ANSI/BHMA A156.3-2020 (32 and 32D finishes only)
UL305 (2017)
CAN/ULC-S132 (2016)
California Building Code (2019) Sec. 11B-309.4
ADA Compliant
A156.41 (2020)
IBC Sec. 1010.1.9.6 (2021)
A156.3-2020 1000lb Security Test

Available Finishes:

- US32/629
- **US32D/630**
- US32DMS
- US32MS
- US32D (device)/
US32 (push area)
- 314E
- 10BE/Stock
Powder Coats

Engraved
PUSH Area Finish
Options:

- Black
- White
- Less Paint
- Custom Color

DIMENSIONS:
Grip: Ø 1 1/4"

Vertical (crash bar
to top of tube): 28
1/2" min; Max per
GANA guidelines

Horizontal: 15 3/4"
min; 48" max

Projection:
2 5/8" Panic side;
3 1/4" Mating pull
side

Sold Through:



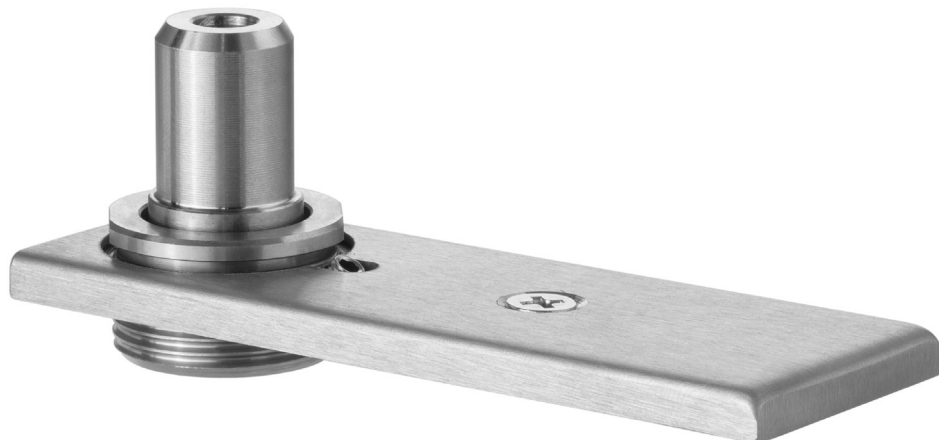
Authorized Channel Partner
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PF-ADJ-PIVOT Adjustable Pivot for Patch Fitting



Available Finishes:

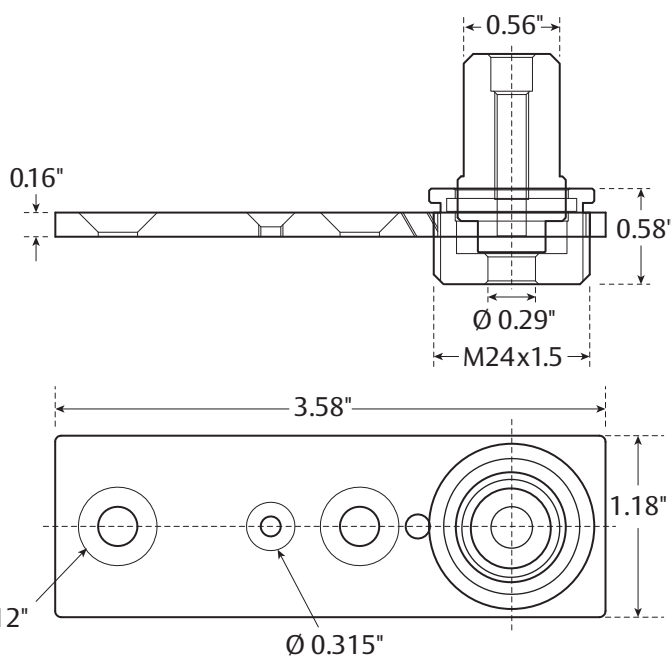
- **US32D/630**
- US32/629
- US28/628
- 314
- 314E
- BSP
(Black Suede Powder Coat)
- WSP
(White Suede Powder Coat)
- Stock Powder Coats

CLEARANCE

Min. $\frac{5}{16}$ "
Max. $\frac{5}{8}$ "

WEIGHT LIMIT

220 lbs.



Specifications:

MATERIAL:

Stainless Steel

WHERE USED:

Floor or Threshold

COMPATIBLE PARTS:

PFD-10 Bottom Patch

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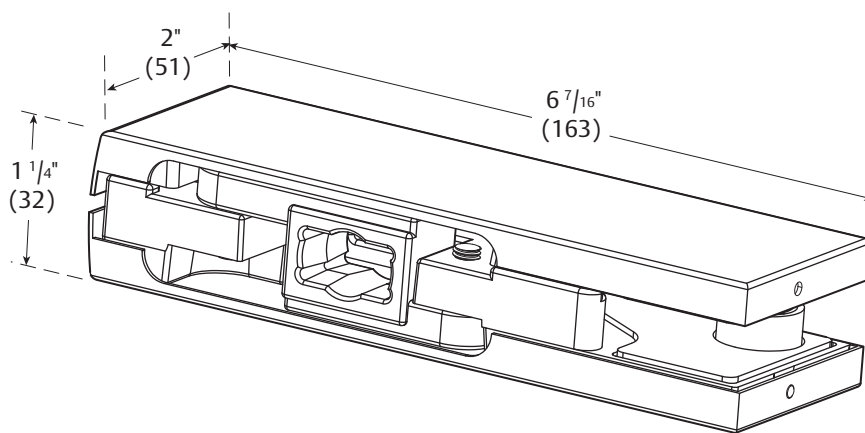
PFD-10 Door Bottom Patch

Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314E
- BSP
(Black Suede
Powder Coat)
- WSP
(White Suede
Powder Coat)
- Stock Powder
Coats

GLASS THICKNESS

$\frac{3}{8}$ " , $\frac{1}{2}$ " , $\frac{9}{16}$ "



Specifications:

MATERIAL:

Aluminum Body, Stainless Steel Inserts

WHERE USED:

Door Bottom

INCLUDED PARTS:

Pivot/Closer Inserts

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PFD-22 Door Top Patch



Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314E
- BSP
(Black Suede Powder Coat)
- WSP
(White Suede Powder Coat)
- Stock Powder Coats

GLASS THICKNESS

$\frac{3}{8}$ " , $\frac{1}{2}$ " , $\frac{9}{16}$ "

Specifications:

MATERIAL:

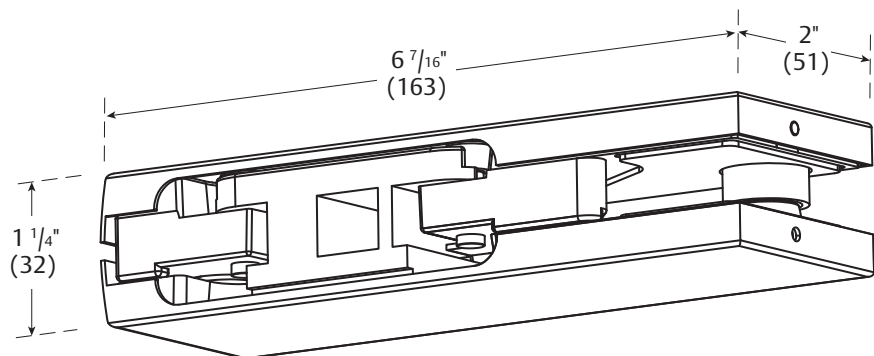
Aluminum Body, Stainless Steel Inserts

WHERE USED:

Door Top

INCLUDED PARTS:

OHC Insert



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PV-FM-300END 300 lb. End Load Bottom Pivot

Available
Finishes:

• US32D/630

CLEARANCE:

Min. $\frac{5}{16}$ "

Max. $\frac{3}{4}$ " w/Shims

MAXIMUM

DOOR WEIGHT:

300 lbs.

MAXIMUM

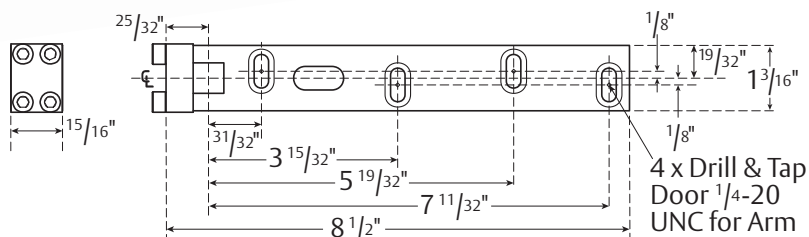
DOOR WIDTH:

Interior: 48"

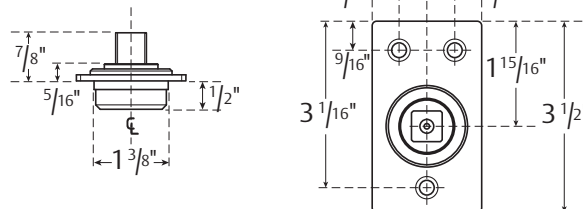
Exterior: 42"



Bottom Pivot Door Portion



Bottom Pivot Floor Portion



Specifications:

MATERIAL:

Aluminum and Stainless Steel

WHERE USED:

P Style Doors, Floor Application

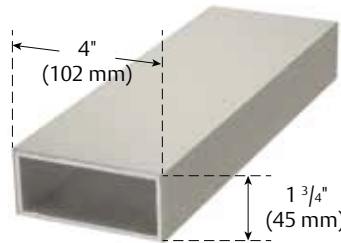
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Concealed Overhead Closer Header -Note header to be recessed in drywall bulkhead flush with adjacent glass partition bulkhead.

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HDS-1750x4000 Solid Header



Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314
- 314E
- 10BE/Stock Powder Coats
- BSP (Black Suede Powder Coat)
- WSP (White Suede Powder Coat)

DIMENSIONS

1 3/4" x 4"

Specifications:

MATERIAL:

Aluminum Body, Bright or Satin Stainless Steel Cladding.

FEATURES:

- All hardware mounting brackets and clips come pre-installed.
- Vinyl gasketing for all sidelite applications included.
- Lengths up to 144" (90" for anodized finishes).
- .125" thick walls for security hardware mounting applications.

OPTIONS:

Fabricated for a variety of locking mechanisms and accessories.



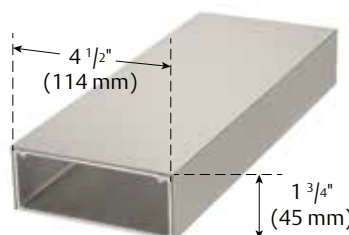
GD-ROLLIN-B
Roll-in for 1/2" glass

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HDR-1750x4500 Two-Piece Header



Available Finishes:

- US32D/630
- US32/629
- US28/628
- 314
- 314E
- 10BE/Stock Powder Coats
- BSP (Black Suede Powder Coat)
- WSP (White Suede Powder Coat)

GLASS THICKNESS

$\frac{3}{8}$ " , $\frac{1}{2}$ " , $\frac{9}{16}$ "
 $\frac{5}{8}$ " , $\frac{11}{16}$ " , $\frac{3}{4}$ " , $\frac{13}{16}$ "

DIMENSIONS

$1 \frac{3}{4}$ " x $4 \frac{1}{2}$ "

Specifications:

MATERIAL:

Aluminum Body, Bright or Satin Stainless Steel Cladding.

FEATURES:

- All hardware mounting brackets and clips come pre-installed.
- Vinyl gasketing included for all sidelite applications.
- Easy installation without exposed fasteners.
- Sidelite glazing pocket available for sidelite application.



GD-ROLLIN-B
Roll-in for $\frac{1}{2}$ " glass

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Rockwood 403 - Concave Solid Cast Wall Stop



Available Finishes:

- US3/605
- US4/606
- US10/612
- US10B/613
- US10BE/613E
- US15/619
- US26/625
- **US26D/626**

SIZE:

Ø 2 7/16"

Projection: 1"

WEIGHT:

2 lbs./10

ANSI A156.16:

L02251

Specifications:

MATERIAL:

Cast Brass with Rubber Bumper

FASTENERS:

#6 x 1 1/2" Flat Head Sheet Metal Screw, Plastic Toggle

FEATURES:

Concealed mounting, concave bumper.

BUMPER:

Concave

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Rockwood 441CU - Dome Stop Combination Unit



Available Finishes:

- US3/605
- US4/606
- US10/612
- US10B/613
- US10BE/613E
- US26/625
- **US26D/626**

SIZE:

Dome Base: $\varnothing$ 1 $\frac{7}{8}$ "
x $\frac{1}{4}$ "h
Height: 1 $\frac{1}{8}$ " or 1 $\frac{1}{2}$ "
Riser Base: $\varnothing$ 2" x $\frac{3}{8}$ "h

WEIGHT:

1.85 lbs./10

ANSI A156.16:

L02141/L02161

Specifications:

MATERIAL:

Solid Cast Brass with Rubber Bumper

FASTENER:

#12 x 1 $\frac{1}{2}$ " Flat Head Wood Screw, Plastic Anchor

#12-24 x 1 $\frac{1}{2}$ " Flat Head Machine Screw, Anchor

FEATURES:

Convertible for undercut or not undercut doors.

For use at doors with or without a threshold.

OTHER:

Set consists of 1 each No. 441 and 1 each No. 444.

For use at doors with or without a threshold.

OPTIONS:

Exterior Pack screw packs; stainless steel plated to match - use EXP suffix (441CU x EXP) when ordering

WARNING

This product can expose you to lead which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65warnings.ca.gov.

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Rockwood 570 - Dust Proof Strike



Available Finishes:

- US3/605
- US4/606
- US10/612
- US10B/613
- US10BE/613E
- US26/625
- **US26D/626**

SIZE:

Face Plate: 1 $\frac{3}{8}$ " x 2 $\frac{7}{8}$ "

Barrel: $\varnothing$ $\frac{3}{4}$ " x dp. 2"

WEIGHT:

0.4 lbs.

ANSI A156.16:

L04021

Specifications:

MATERIAL:

Brass

FASTENERS:

Adjustment Nut; Spanner Wrench; 2 ea. #8 x 1 Oval Head Sheet Metal Screws,
2 ea. Plastic Anchors; 2 ea. #8-32 x $\frac{3}{4}$ " Oval Head Machine Screws, 2 ea. Anchors

FEATURES:

- Works with all Rockwood manual and automatic flush bolts
- Removable face plate for use with thresholds
- Adjustable height for carpeted areas

WARNING

This product can expose you to lead which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65warnings.ca.gov.

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Rockwood LP3301 - PostMount Locking Pull



LP3301FHD ADA.32D

FULL HEIGHT DOWN
LOCKING LADDER
PULL - ADA

Available Finishes:

- US3/605
- US4/606
- US10BE/613E
- US10BL/614
- US32/629
- **US32D/630**
- US32MS
- US32DMS
- BSP
- WSP
- Stock Powder Coats
- Special Powder Coats

Specifications:

FEATURES:

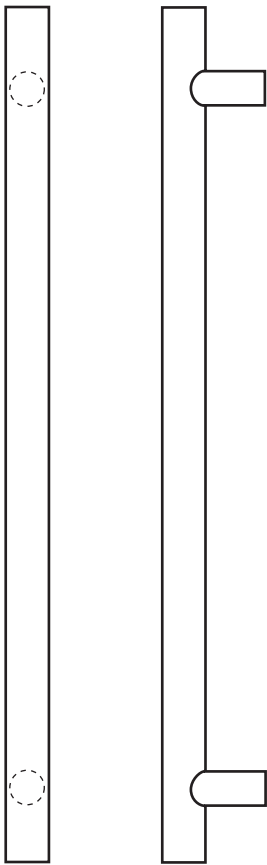
- Key operated from outside; turn piece on inside
- Cylinder options: Rim Cylinder, Small format interchangeable core housing: 7-pin (SFIC) less core and key (Standard), Small format interchangeable core housing w/ plastic construction core: 7-pin (SFIC), Customer Supplied Cylinder, Dummy Cylinder, or Privacy Function: keyless locking function
- Door types: $\frac{3}{8}$ " - $\frac{7}{8}$ " thick glass, $1\frac{3}{8}$ " - $2\frac{1}{2}$ " thick aluminum, hollow metal or wood doors
- Multiple locking options: floor, head or both
- Bolt location: 2" from face of door to centerline of bolt
- Bolt has $\frac{13}{16}$ " travel with fine adjustment
- Horizontal push/pull bar option

BENEFITS:

- Cylinder and thumbturn location eliminates physical strain when locking and unlocking
- Glass door applications secure the opening and allow for more natural light
- Bolt concealed inside pull provides a clean, streamlined look
- Simple door preparation allows for faster installation
- Suites with popular Rockwood door pulls, CORBIN RUSSWIN and SARGENT lever handles, McKINNEY hinges, creating a continuum of design
- Offers flexibility in custom sizes for a variety of applications

The global leader in
door opening solutions

Rockwood RM3301 - MegaTek - Straight Pull - Flat Ends



RM3301BTB7284

84" BTB PULL - 72"
HOLES CTC FOR
POSTS

Available Finishes:

- US3/605
- US4/606
- US10/612
- US10B/613
- US10BE/613E
- US28/628
- US32/629
- US32316
- **US32D/630**
- US32D316
- 313/710
- 315/711

DIAMETER:
1 1/4"

CTC:
Specify

Specifications:

MATERIAL:
Aluminum, Brass, Bronze, Stainless Steel

OPTIONS:
For optional mid-post, suffix the product number with "MP" (example: RM3301MP). Over 96" available on select finishes.

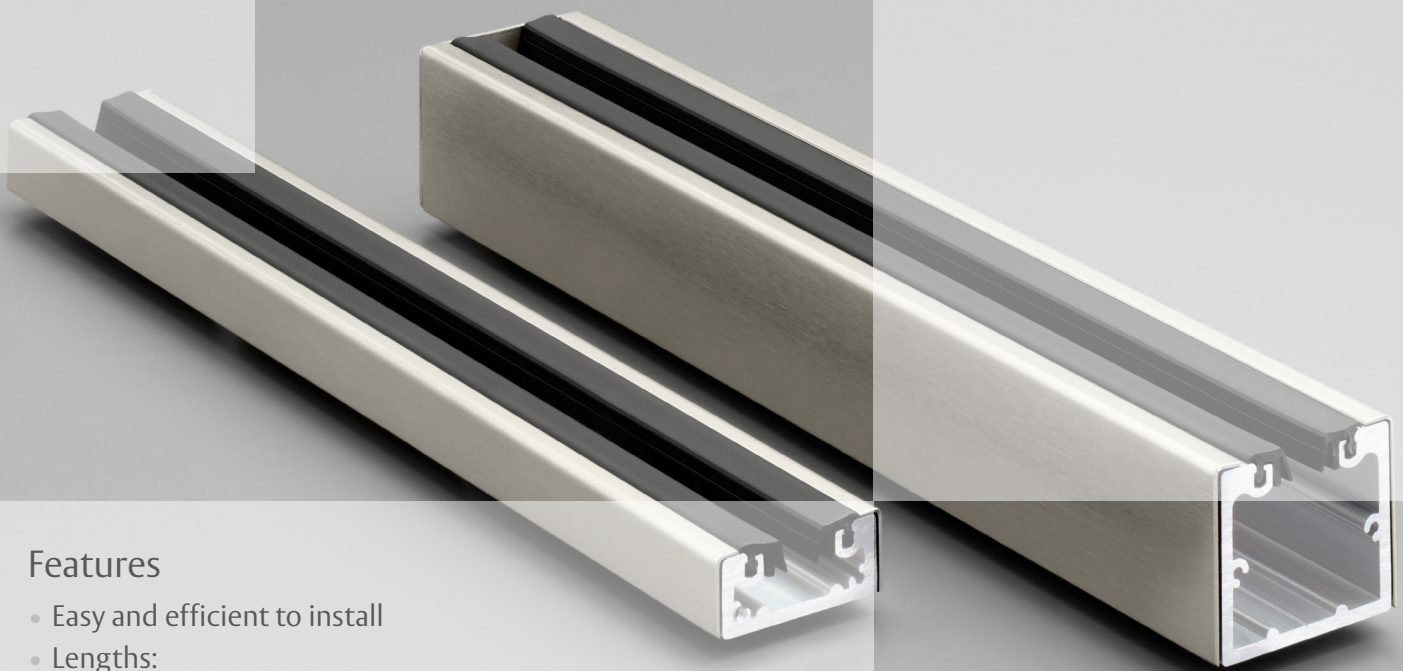
ORDERING:
Specify CTC and overall length

U-Channels

ASSA ABLOY
Opening Solutions

U Channels for glass walls

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Features

- Easy and efficient to install
- Lengths:
 - 90" max on clear anodized (dry only)
 - 120" max on powdercoat
- Standard pre-fit, dry-glaze, black vinyl
 - Gray vinyl option for 1/2" glass only
- Wet/dry glaze channel (Gasketing not standard)
 - Wedge gasket available
 - Can be used with silicone
- End caps sold separately
- Setting blocks not included

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Technical Specifications

Materials:

- Anodized aluminum body
 - Bright dripped aluminum (wet/dry)
 - Bright or satin stainless steel cladding (dry only)

Glass Wall Specifications:

- For glass walls 3/8", 1/2" and 9/16" thick
**UWD-1000/2000x1250 offered for 5/8", 11/16" and 3/4" thick glass*

Finish Options:

- Satin Stainless Steel (US32D/630)
- Bright Stainless Steel (US32/629)
- Clear Anodized Aluminum (US28/628)
- Extra Dark Bronze Anodized Aluminum (314)
- Extra Dark Bronze Equivalent (314E)
- Black Suede Powder Coat (BSP)
- White Suede Powder Coat (WSP)
- Stock Powder Coats

Gasketing Options



GD-PREFIT-B
Pre-fit for
1/2" glass



GD-PREFIT-A
Pre-fit for
3/8" glass



GD-ROLLIN-B
Roll-in for
1/2" glass



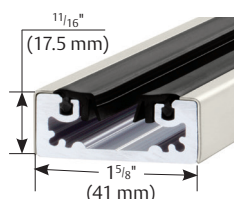
GD-WEDGE
Wedge for
1/2", 3/4" glass



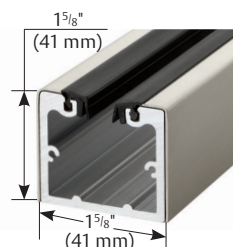
GD-WEDGE-AD
Wedge for
3/8", 5/8" glass

Dry U-Channels

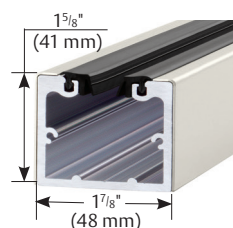
UCD-0687x1625



UCD-1625x1625

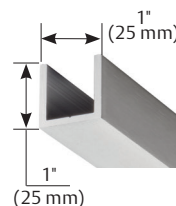


UCD-1625x1875

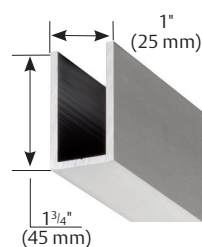


Wet/Dry U-Channels

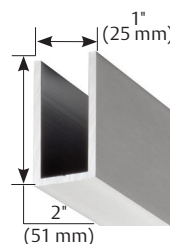
UWD-1000x1000



UWD-1750x1000

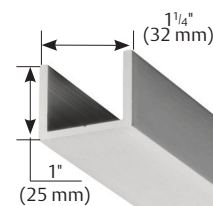


UWD-2000x1000

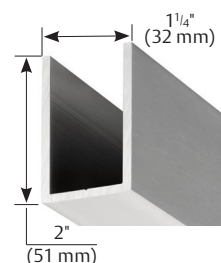


Wet/Dry U-Channels

UWD-1000x1250*



UWD-2000x1250*



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855 594 6989

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Door Security Solutions Canada
Vaughan, ON L4K 4T9
www.assaabloydss.ca
800 461 3007

Product Data Sheet

Table of Performance Values*1									
Glass Thickness		Visible Light Transmittance (VLT) ²	Visible Light Reflectance ²		(Btu/hr°ft ² °F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light to Solar Gain (LSG) ⁵	
Inches	mm		Exterior %	Interior %	Winter Nighttime	Winter Argon			
Uncoated									
Clear Glass									
	1/8	3	90	9	9	1.04	na	0.86	1.05
	5/32	4	90	9	9	1.04	na	0.84	1.07
	3/16	5	89	9	9	1.03	na	0.83	1.07
	1/4	6	89	8	9	1.02	na	0.82	1.09
	5/16	8	87	8	9	1.01	na	0.79	1.10
	3/8	10	87	8	8	1.00	na	0.77	1.13
	1/2	12	85	8	8	0.98	na	0.73	1.16
	5/8	16	84	8	8	0.97	na	0.70	1.20
	3/4	19	83	8	8	0.95	na	0.67	1.24

PRODUCT DESCRIPTION

Clear glass by Vitro Architectural Glass is a soda-lime float glass product with a slightly green inherent color that deepens as thickness increases. Its relatively high visible light transmittance (89% at 6mm) and its greenish edge are two characteristics. Clear glass mechanical and physical properties are similar to other soda-lime float glass products.

APPROXIMATE WEIGHTS

Per m ²		Per ft ²	
thickness	weight	thickness	weight
2.5 mm	6.9	3/32	1.3 lbs
3.0 mm	8.2 kg	1/8	1.5 lbs
4.0 mm	9.9 kg	5/32	2.0 lbs
5.0 mm	11.9 kg	3/16	2.4 lbs
6.0 mm	14.2 kg	1/4	2.9 lbs
8.0 mm	19.8 kg	5/16	4.0 lbs
10.0 mm	23.8 kg	3/8	4.9 lbs
12.0 mm	31.8 kg	1/2	6.4 lbs
16.0 mm	41.0 kg	5/8	8.0 lbs
19.0 mm	50.9 kg	3/4	10.0 lbs

COLOR

	6.0mm
Transmitted Color: D65, 10° L*	95.4
a*	-1.8
b*	0.1
Hue Angle (°)	176
Dominant wavelength: C, 2°	496 nm

CHEMICAL COMPOSITION

SiO ₂	73%
Na ₂ O	14%
CaO	9%
MgO and Trace elements	4%

MECHANICAL PROPERTIES

Knoop Hardness Number (indentation hardness) indenter load--500 gm	470 kgf/mm ²	
Poisson's Ratio	0.22	
Modulus of Elasticity (Young's)	73.1 GPa	10,600,000 psi
Tensile Strength (Determined as Modulus of Rupture, ultimate)	41.4 MPa	6,000 psi
Density at 21°C (70°F)	2.51 g/cm ³	157 lb/ft ³

THERMAL PROPERTIES

Hemispherical Emissivity at -18 to 66 °C (0 to 150°F) glass	0.84	
Expansion Coefficient (linear) 20 to 300°C (68 to 572°F)	8.6*10 ⁻⁶ /°C	4.8*10 ⁻⁶ /°F
Specific heat at 0 to 100°C (32 to 212°F)	858 J/kg-K	0.205 Btu/lb-°F
Thermal Conductivity (k) at 50°C (122°F)	0.937 W/m-K	0.542 Btu/hr-ft-°F
Softening Point	723°C	1333°F
Annealing Point	544°C	1011°F
Strain Point	504°C	939°F

SUSTAINABILITY

To provide architects with the assurance and documentation they need to meet and verify their sustainability goals, Vitro Architectural Glass participates in a range of programs and initiatives. Resources available include, but are not limited to:

Type III Environmental Product Declarations

Cradle to Cradle Certified™ Bronze with associated Gold Material Health Certificate

LEED® and Living Building Challenge documentation

Material Ingredient Disclosure and Safety Data Sheets

Annual Corporate Sustainability Report

Further information is available through VitroGlazings.com or by calling 855-887-6457 (VTRO GLS)



SOLAR PERFORMANCE VALUES ^[1]

Glass Thickness		Transmittance				Reflectance	
inches	mm	Ultra-violet (%)	Visible (%)	Infrared (%)	Total Solar (%)	Visible (%)	Total Solar (%)
1/8	3.0	73	90	78	83	9	8
5/32	4.0	71	90	75	81	9	7
3/16	5.0	69	89	72	79	9	7
1/4	6.0	66	89	69	77	8	8
5/16	8.0	61	88	62	72	8	7
3/8	10.0	58	87	56	69	8	7
1/2	12.0	53	85	48	64	8	6
5/8	16.0	48	84	41	59	8	6
3/4	19.0	46	83	36	55	8	6

^[1] Figures may vary due to manufacturing tolerances. All tabulated solar performance data are based on the methodology prescribed in ISO 9050, 2003 except Infrared, which is based on the solar irradiance data prescribed by ISO 9050, 2003 from 780 to 2500 nm. Slight changes in transmitted optical properties may occur on exposure to sunlight.

In Recognition of Excellence

Glass Enterprises, Inc.

Bensalem, PA

Successfully completed the

Certified Fabricator Requirements

The glass fabrication facility named above has successfully completed all Vitro Architectural Glass Inspection and Audit Requirements and is Certified to fabricate Vitro Architectural Glass products through June 30, 2022.

Joanne Funyak

Director, Certified Programs and Sales Support



A PROGRAM
MEMBER
SINCE 2019



This certificate is in compliance with AIA MASTERSPEC Part-1 General sections dealing with Submittals and Quality Assurance.



Administrative Management Systems, Inc.
205 West Main Street, PO Box 730
Sackets Harbor, NY 13685
Phone: (315) 646-2234
Fax: (315) 646-2297
E-mail: staff@amscert.com



#0961
ISO/IEC 17065
Product Certification Body

ACKNOWLEDGEMENT OF CERTIFICATION

THIS IS TO ACKNOWLEDGE THAT AS OF THIS DATE

Glass Enterprises, Inc.
Bensalem, PA

IS A CURRENT LICENSEE AND HAS MET ALL GUIDELINES AND REQUIREMENTS FOR THE IGCC®/IGMA® CERTIFICATION PROGRAM AND AS SUCH IS ELIGIBLE TO LABEL THE BELOW INDICATED PRODUCT(S) AS IGCC®/IGMA® CERTIFIED. THE FOLLOWING ARE IN COMPLIANCE WITH ASTM E2190 FOR SEAL DURABILITY OF INSULATING GLASS UNITS AND PASSING GAS CONTENT INITIAL AND AFTER WEATHERING (GCIA) CERTIFICATION REQUIREMENTS AS INDICATED.

<u>CERT #</u>	<u>GLASS</u>	<u>SPACER</u>	<u>FRAME CONST.</u>	<u>DESICCANT</u>	<u>SEALANT</u>	<u>GCIA</u>	<u>IC</u>
3701	U/C2	AA	BC4/GSLC	LF	PIB/PS2	No	BA
5269	U/C2	AA	BC4/GSLC	LF	PIB/S2	No	
5439	U/C2	FSF	BC4/MC1/MT	IB	PIB/S2	No	
5440	U/C2	FSF	BC3/MC1/MT	IB	PIB/PS2	No	

THIS IGCC®/IGMA® PROGRAM CERTIFICATION IS CURRENT AND IN FULL EFFECT AS OF THIS ISSUE DATE. CERTIFICATION IN THE IGCC®/IGMA® PROGRAM IS SUBJECT TO SEMI-ANNUAL RENEWAL. PLEASE CHECK THE CURRENT CERTIFIED PRODUCTS DIRECTORY OR THIS OFFICE FOR MOST CURRENT INFORMATION.

Monday, January 17, 2022

DATE OF ISSUE

February 1, 2022 - January 31, 2023

CERTIFICATION PERIOD


ADMINISTRATIVE MANAGER



safety glazing
certification council

Administrative Office, AMS, Inc.
205 West Main Street, PO Box 730
Sackets Harbor, NY 13685
Phone: (315) 646-2234
E-mail: SGCC@amscert.com



#0961
ISO/IEC 17065
Product Certification Body

ACKNOWLEDGEMENT OF CERTIFICATION

THIS IS TO ACKNOWLEDGE THAT AS OF THIS DATE

Glass Enterprises, Inc.
Bensalem, PA

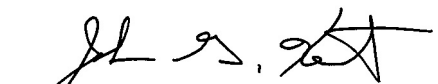
IS A CURRENT LICENSEE AND HAS MET ALL GUIDELINES AND REQUIREMENTS FOR THE SGCC® CERTIFICATION PROGRAM AND AS SUCH IS ELIGIBLE TO LABEL THE BELOW INDICATED PRODUCT(S) AS SGCC® CERTIFIED. REPRESENTATIVE SAMPLES OF THE BELOW PRODUCTS HAVE BEEN FOUND TO BE IN COMPLIANCE WITH ANSI Z97.1-2015 AS INDICATED AND CPSC 16 CFR 1201 STANDARDS, KNOWN AS COMPOSITE CERTIFICATION (COMP), OR BOTH STANDARDS WITH CAN/CGSB 12.1-2017 KNOWN AS COMP+CAN.

<u>SGCC#</u>	<u>IN</u>	<u>MM</u>	<u>Attributes</u>	<u>INT</u>	<u>Type Code</u>	<u>Max Size</u>	<u>ANSI Class</u>	<u>Test Std</u>
4628	3/16	5			TTG	U	A	COMP
4629	1/4	6			TTG	U	A	COMP
6597	3/8	10			TTG	U	A	COMP
6598	1/2	12			TTG	U	A	COMP

THIS SGCC® PROGRAM CERTIFICATION IS CURRENT AND IN FULL EFFECT AS OF THIS ISSUE DATE. CERTIFICATION IN THE SGCC® PROGRAM IS SUBJECT TO SEMI-ANNUAL RENEWAL. PLEASE CHECK THE SGCC WEBSITE AT WWW.SGCC.ORG OR THIS OFFICE FOR MOST CURRENT INFORMATION.

Monday, January 17, 2022
DATE OF ISSUE

F22
CERTIFICATION PERIOD


ADMINISTRATIVE MANAGER



GLASS ENTERPRISES INC.

GLASS ENTERPRISES, INC. ONE (1) YEAR HEAT TREATED LIMITED WARRANTY

LIMITED WARRANTY OF HEAT STRENGTHENED OR TEMPERED GLASS. Glass Enterprises, Inc. ("GEI"), a Pennsylvania corporation, warrants only to the original non-consumer customer (the "Customer") for a period of one (1) year from the date of sale to the Customer (the "Limited Warranty Period") that heat strengthened and tempered glass products produced by GEI ("Heat Strengthened Glass") and ("Tempered Glass") and purchased by the Customer meet at the time of sale ASTM Standard Specification C1048 Standard Specification for Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass. GEI also warrants only to the original non-consumer Customer for a period of one (1) year from the date of sale to the Customer (the "Limited Warranty Period") that Tempered Glass products produced by GEI ("Tempered Glass") and purchased by the Customer meet at the time of sale the requirements of the Safety Glazing Certification Council ("SGCC").

Subject to the terms and conditions set forth below, Glass Enterprises, Inc., warrants that, when used in accordance with (i) our technical data sheets and other written instructions, (ii) applicable building codes and regulations, and (iii) standard industry practices, its heat-treated glass products (the "Products" and each a "Product") will:

1. Conform to ASTM C 1048 Standard specification for Heat Treated Glass , Kind HS, Kind FT, Coated and Uncoated- and GANA Engineering Standards;
2. Comply with ANSI Z97.1 (current version) and CPSC CFR 1201 (applies only to **fully tempered glass with logo**); and
3. Be free from material manufacturing defects, at the time of manufacture.

This Limited Warranty shall be conditioned upon and subject to the installer, general contractor, architect of record or owner's (each a "Customer") determination that the Products are suitable for and compatible with the Customer's intended use, and such determination shall be the sole responsibility of the Customer.

SOLE REMEDIES APPLICABLE TO LIMITED WARRANTIES OF HEAT STRENGTHENED GLASS AND TEMPERED GLASS. If any breach of either of the preceding Limited Warranties respecting Heat Strengthened Glass and Tempered Glass (the relevant product(s) is(are) the "Product(s)") is reported to GEI before the end of the applicable Limited Warranty Period by the Customer, GEI, at its exclusive option, will upon confirmation of the existence of a defect covered by the applicable Limited Warranty either:

- a. Provide a replacement Product to the Customer in exchange for the defective Product or,
- b. Refund to the Customer GEI's original selling price for such defective Product. If GEI elects to supply a replacement Product, any Limited Warranty that would otherwise apply to such replacement Product will only extend for a Limited Warranty Period equal to the remaining balance of the original Limited Warranty Period for the defective Product. All replacement Products will be provided FOB GEI's nearest plant.

CONDITIONS THAT WILL VOID THIS LIMITED WARRANTY

- a. The Product is broken or fractured.
- b. The Product is stored, processed, installed, cleaned, or otherwise handled contrary to Guardian's written instructions and published Terms and Conditions, Material Handling Guidelines, Product Application Notes, or other guidelines, which are incorporated by reference into this Limited Warranty, or to applicable industry standards.
- c. The Product is discarded or destroyed before reasonable opportunity for inspection by GEI.
- d. The Product is damaged not due to any fault of GEI, including for example by abnormal weather conditions; faulty installation, building construction or building design; exposure to acids, alkalis, or incompatible cleaning materials such as corrosive or abrasive compounds; or contact with abrasive items.
- e. The following are specifically excluded from coverage under this Limited Warranty - The failure of, damage to, or defects in the Products resulting from or caused by: improper usage; use of cleaners, solvents, acids, alkalis or any chemicals on or around finished Products; the placement of any type of aftermarket film on the Products; faulty building construction or design; glass breakage, whether spontaneous, accidental or from any other cause; Acts of God, including, but not limited to hurricanes, flooding, earthquakes or other types of natural disasters and/or abnormal weather conditions; acts of negligence, or the misuse or abuse of the Products; improper installation; failure to comply with our technical data sheets and other written instructions, applicable building codes and regulations, and standards industry practices; incompatibility with other coating, sealants, gaskets, lubricants, insulation or any other materials; normal wear and tear due to usage; and scratched or abrasions to the Products. The Limited Warranty will be null and void in the event that full payment is not received for the goods and services within the agreed upon terms of sale.

CLAIMS UNDER THIS WARRANTY. To make a claim under this Limited Warranty, Guardian's customer must:

- a. Notify GEI of any alleged defect within thirty (30) days from the date of discovery, in

writing, and

- b. provide GEI an opportunity to inspect the Product before its removal from any IG unit, end product, or installation/glazing system.

If a Product fails to conform to this Limited Warranty, GEI's liability is limited, at GEI's exclusive option, to GEI replacing the Product without charge at the original point of delivery or, in the alternative, refunding 100% of the original net selling price to its customer. This Limited Warranty does not cover labor or any other replacement, installation, or fabrication costs. The warranty period for any replacement Product supplied under this Limited Warranty extends only to the remaining warranty period on the original Product.

DISCLAIMER OF IMPLIED & OTHER WARRANTIES. THE PRECEDING EXPRESS LIMITED WARRANTIES ARE THE EXCLUSIVE WARRANTIES MADE BY GEI NOTWITHSTANDING ANY OTHER DOCUMENT OR PROVISION INCLUDING WITHOUT LIMITATION ANY SPECIFICATIONS AND GEI MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, WITH RESPECT TO THE PRODUCTS SOLD IN CONNECTION WITH THIS DOCUMENT, WHETHER (a) AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, SATISFACTORY QUALITY OR ANY OTHER MATTER; (b) ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE; OR (c) THAT THE PRODUCTS WILL BE FREE FROM INFRINGEMENT OR VIOLATION OF ANY RIGHTS, INCLUDING INTELLECTUAL PROPERTY RIGHTS, OF THIRD PARTIES.

EXCLUSIVE REMEDIES. THE EXPRESS REMEDIES STATED IN THIS DOCUMENT WILL BE THE EXCLUSIVE REMEDIES AVAILABLE TO THE CUSTOMER AGAINST GEI FOR ANY DEFECTS IN THE PRODUCTS SOLD IN CONNECTION WITH THIS DOCUMENT OR FOR DAMAGES RESULTING FROM ANY CAUSE WHATSOEVER WITH RESPECT TO SUCH PRODUCTS, INCLUDING WITHOUT LIMITATION, GEI'S NEGLIGENCE. The purpose of the express exclusive remedies is to provide the Customer with the replacement of, or to enable the Customer to return in exchange for cash consideration, products produced by GEI which are found to be defective under any one of the preceding Limited Warranties. These exclusive remedies will not be deemed to have failed of their essential purpose as long as GEI is willing and able to replace such defective products in the prescribed manner or willing to accept return of such defective products in exchange for the stated cash consideration. **GEI WILL NOT IN ANY EVENT BE LIABLE TO THE CUSTOMER FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND, WHETHER FOR DEFECTIVE OR NONCONFORMING PRODUCTS, BREACH OR REPUDIATION OF ANY TERM OR CONDITION OF THIS DOCUMENT, NEGLIGENCE, OR ANY OTHER REASON. THESE EXCLUSIVE REMEDIES SHALL BE THE CUSTOMER'S EXCLUSIVE REMEDIES EVEN IF ONE OF THE PRECEDING LIMITED WARRANTIES FAILS OF ITS ESSENTIAL PURPOSE. FOR PURPOSES OF THIS SECTION, "GEI" INCLUDES GEI'S DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, REPRESENTATIVES, SUBCONTRACTORS AND SUPPLIERS. IN NO EVENT SHALL THE TOTAL COLLECTIVE CUMULATIVE LIABILITY OF GEI, ITS EMPLOYEES, OFFICERS, AGENTS, AND DIRECTORS EXCEED THE AMOUNT**

PAID TO GEI BY THE CUSTOMER FOR THE PRODUCT FROM WHICH SUCH LIABILITY AROSE DURING THE TWELVE (12) MONTH PERIOD PRECEDING THE DATE OF THE MOST RECENT CLAIM BY THE CUSTOMER.

LIMITATIONS APPLICABLE TO ALL LIMITED WARRANTIES. The preceding Limited Warranties are given only to the Customer who is the first non-consumer purchaser of the relevant product, and are not given to any subsequent owners or any other user of such product or any other person or entity. The preceding Limited Warranties do not apply to alleged defects resulting from or related to: improper use or applications, persistent exposure to moisture in the sash, incompatible glazing materials, misuse, rough handling, job site/window cleaning scratching or other abuse, failure to adhere to applicable instructions, glass breakage, tampering, neglect or any reason not related to defects in material or workmanship of the relevant product. The preceding Limited Warranties respecting Heat Strengthened and Tempered Glass will also not apply to products that are subjected to additional fabrication (e.g. grinding, drilling, sandblasting, etc.) or exposed to temperatures in excess of 40 degrees Fahrenheit for a sustained period of time. The preceding Limited Warranties respecting Heat Strengthened and Tempered Glass Products will also not apply if there is incompatibility of the interlayer with other materials used in conjunction with the Laminated Glass Product or the Laminated Glass Product is exposed to corrosive materials, including but not limited to sulfur or chlorine. The preceding Limited Warranties respecting Heat Strengthened and Tempered Glass will also not apply to Insulating Glass Units that are installed in structural glazing and sloped glazing applications unless GEI reviews in advance and approves in writing all of the glazing details and other relevant facts of the proposed application and the actual application conforms in all respects to the details and facts disclosed to GEI and the conditions of GEI's written approval.

In particular, we assume no responsibility for glass breakage, improper usage, failure of Beta-Temp on account of faulty installation or building construction or design, improper handling, any alteration of the glass, installation in sloped glazing, glass installed in high humidity areas, glass installed within 500 yards of salt water or in swimming pool areas, glass installed in standing water or liquids or unless otherwise agreed.

In addition to the conditions, exclusions and limitations set forth in this limited warranty, no warranties are made which cover failures or operating difficulties due to accident, abuse, misuse, alteration, misapplication, faulty building construction or design, improper or insufficient handling, storage, installation, maintenance or service. Also excluded from the above warranties are failures or operating difficulties resulting from exposure to corrosive fumes or condensates, subjection to abnormal stress from localized application of heat, including, but not limited to filming of glass, excessive vibration or movement of buildings or foundations or to other abnormal physical stress.

PRODUCT SUITABILITY. Annealed glass is not suitable for use in locations identified as "hazardous" in certain building codes and federal laws. The Customer has the responsibility to use safety glazing materials (e.g. tempered glass or laminated glass) in hazardous locations. The Customer is solely responsible for determining whether a product purchased from GEI is suitable for the Customer's needs or application. Although GEI may be asked to provide information or its

opinion about its product(s) in a proposed application or make information or its opinions available from time to time, GEI will not, by responding to requests for or otherwise providing information or opinions, assume any responsibility for the design or suitability of the Customer's product(s) in the proposed application, the Customer's methods, processes or products, to supplement any information or opinions provided or to make further information or opinions available. The Customer will at all times be responsible for determining the suitability of GEI's or GEI's affiliates' information, opinions, processes, products and services for use in the Customer's own applications and for identifying and performing to the Customer's satisfaction all quality control tests, analyses, forecasts, and other tests and examinations necessary to assure that the Customer's products and services will be safe, acceptable and suitable for use under end-use conditions.

This limited warranty shall be governed and construed and interpreted in accordance with the Laws of the State of Pennsylvania without regard to principles of conflicts of laws. Any dispute, action or proceeding arising out of or relating to this limited warranty shall be submitted to arbitration pursuant to the Construction Arbitration Rules of the American Arbitration Association (AAA), shall be venued in Bucks County, Pennsylvania or the nearest AAA Facility to Bucks County, Pennsylvania and shall be the parties' exclusive method of dispute resolution. Any objection, which may now or hereinafter exist to the laying of venue and/or jurisdiction as set forth above is hereby waived. The bringing of any suit, action or proceeding, which is not in conformance with the foregoing, shall void this limited warranty.

The above Limited Warranty is granted in reference to the below project and/or products supplied by Glass Enterprises, Incorporated.



Glass Informational Bulletin

GANA 01-0116

Proper Procedures for Cleaning Architectural Glass Products

Architectural glass products play a major role in the comfort of the living and working environment of today's homes and commercial office spaces by providing natural daylight, views of the surroundings, thermal comfort and design aesthetics. Glass usage and condition often affect our selection of where we live, work, shop, play and seek education.

This document describes procedures that generally apply to most architectural glass products. Certain glass types may require different procedures and care. Glass can be clear or tinted, and have pyrolytic or sputtered Low-E or reflective coatings, some of which may be on the exposed surface of the glass. Glass products can be monolithic (single lites), laminated glass or insulating glass units. (See GANA Glass Informational Bulletin GANA ID 01-1107 *Describing Architectural Glass Constructions*). Glass can be of various strengths, i.e., annealed, heat-strengthened or fully tempered. There are also other decorative and functional glass types including spandrel, silk-screened, patterned, acid etch, and sand-blasted.

Architectural glass products should be properly cleaned and protected throughout the construction process using a program of regularly scheduled maintenance designed to maintain visual clarity and prevent glass surface damage. Since glass products can be permanently damaged if infrequently or improperly cleaned, glass producers and fabricators recommend strict compliance with the following procedures for cleaning glass surfaces.

Routine Cleaning & Maintenance

For routine maintenance, interior and exterior glass surfaces should be thoroughly cleaned as dirt and residue appear. Cleaning frequencies should be tailored to the individual characteristics inherent to the site conditions, as well as the severity of local environmental factors and atmospheric pollutants that vary from region to region. Before proceeding with cleaning, determine whether the glass is clear, tinted or reflective. Surface damage is more noticeable on reflective glass as compared with the other glass products. If the reflective surface is exposed, either on the exterior or interior surface, special care must be taken when cleaning, as damage to the reflective glass surface may result in coating removal and a visible change in light transmittance which is very noticeable. A simple test to determine the location of the reflective coating is to touch the point of a pencil to the glass surface. If the reflection of the pencil point meets the real pencil, the coating is exposed on that side. If there is a gap between the pencil point and the reflections, the coating is not exposed on that side of the glass. Cleaning tinted and reflective glass surfaces in direct sunlight should be avoided, as the surface temperature may be too hot for optimum cleaning. Exterior cleaning should begin at the top of the building and continue to the lower levels to reduce the risk of leaving residue and

cleaning solution on glass that has already been cleaned. Cleaning procedures should also include checking that the wind is not blowing the cleaning solution and residue onto already cleaned glass.

Prior to beginning a cleaning project, it is strongly recommended that window cleaners test clean a small area of one window, then stop and examine the surface carefully for any damage to the glass and/or any exposed coating. The ability to detect certain surface damage, such as light scratches, may vary greatly with the lighting conditions. Daylight conditions are needed to properly evaluate a glass surface for damage. Scratches that are not easily seen with a dark or gray sky may be very noticeable when the sun is at a certain angle in the sky or when the sun is low in the sky. In addition, because different backgrounds may yield different observations, cleaning methods should be tested on all glass constructions on the building, including both vision and spandrel units.

Cleaning should begin by soaking the glass surfaces with clean water and a mild, non-abrasive glass cleaning solution. Apply generous amounts of solution to the glass surfaces with a brush, strip washer or other non-abrasive applicator, and lightly agitate to loosen the soil and debris. Immediately following the application of the cleaning solution, a window-cleaning squeegee should be used to remove all of the cleaning solution from the glass surface. During routine cleaning care should be taken to avoid metal contact with the glass surface; razor blades and metal scrapers should not be part of routine cleaning. The use of sufficient water will help prevent abrasive particles from being trapped between the glass and the cleaning tools being used. However, the window cleaner needs to be diligent in keeping all abrasive particles from scratching the glass.

The International Window Cleaning Association (IWCA) recognizes an additional glass cleaning technique being utilized by some professional window cleaning contractors. This technique employs the use of pure water delivered to the glass surface using a specialized extension pole. Gentle agitation with a non-scratching (non-abrasive) brush is followed by the final pure water rinse. Rinse water is generally allowed to evaporate from freshly cleaned surfaces. Therefore, the pure water used in both the wash and rinse must have a total dissolved solids content (TDS) of 20 parts per million (PPM) or less to prevent spotting and streaking of cleansed surfaces. The use of tap water is not acceptable. Effective water treatment, via ion exchange and/or reverse osmosis equipment, should be used in conjunction with delivery & rinse methods at all times. Water quality can be monitored with a hand held TDS or conductivity meter. A reading of 40 micro-Siemens/cm (0.025 Me ohm – cm) represents a TDS level of 20 PPM.

Non-Routine Post-Construction Cleaning & Restoration

Careful communication between the responsible parties should precede the use of aggressive cleaning techniques, as any non-routine cleaning carries a risk of irreparable damage to glass products.

During all stages of construction the glass must be properly protected from construction debris such as cement, paint, varnish, adhesives and other construction material commonly found on job sites. (See the GANA/IWCA Bulletin TD 03-1003 (2010 Edition) *Construction Site Protection and Maintenance of Architectural Glass*). Extended construction schedules may create the need for multiple cleanings to avoid the accumulation of significant amounts of soil and debris, and to avoid potential damage. In addition to ordinary techniques for protection from construction debris used by various trades, temporary protective window films may be applied to glass. Follow specific manufacturer instructions regarding film application and removal. If the film is removed prior to job completion, additional cleanings may still be needed to prevent glass damage. Failure to remove temporary protective films by the manufacturer's recommended date may result in aggressive methods being required to remove the film.

Glass that is improperly stored or left unprotected during construction may result in glass that cannot be successfully cleaned using routine cleaning procedures. In such situations, more aggressive cleaning and

restoration techniques may become necessary, such as the use of razor blades, chemical cleaning and/or mechanical polishing. Glass surface conditions that may require more aggressive cleaning techniques would include, but not be limited to, the accumulation of paint, stain or varnish overspray; mortar, concrete or cement splashing on glass; silicone sealants and/or lubricants being smeared or sprayed onto glass and frames; and sealer overspray or run-off from adjacent masonry or stone waterproofing operations. In the process of removing tenacious contaminants from unprotected glass, particles may be trapped between the razor blade and the glass, resulting in fine scratches.

While members of GANA neither condone nor recommend scraping of glass surfaces with blades or scrapers for routine cleaning, it is recognized that window cleaners may choose more aggressive techniques, including the use of razor blades, in non-routine cleaning. In such cases, use of razor blades should be limited to the affected areas of the glass. Scraping should be done in one direction only with a new blade. Never scrape in a back and forth motion as this could trap particles under the blade that may cause scratches. These scratches may be visible at all times, but in some cases they may be visible only under certain lighting conditions. Significant care should be taken to ensure the glass is not scratched. Razor blades should never be used on coated glass surfaces. Contact a professional window cleaner proficient in construction window cleaning, such as a member of the IWCA for the most appropriate solution.

GLASS TYPES

When cleaning the glass in architectural windows and doors, it is necessary to determine what type of glass is being cleaned and what, if any, type of coatings may be present on the exposed surfaces. In addition to reviewing the bulletins previously referenced, it is important to review the GANA Glass Informational Bulletin TD 02-0402 (2008 Edition) *Heat-Treated Glass Surfaces are Different* before initiating the window cleaning process, as glass may be heat-treated, i.e., heat-strengthened or fully tempered. Heat-treated glass is used in most architectural glass products today for a variety of strength and safety reasons, but it must be understood that heat-treated surfaces require greater care when cleaning as discussed in detail in the above referenced bulletin.

Some glass may contain a logo that may indicate the glass supplier and if the glass is tempered, heat-strengthened or laminated, but it typically will not indicate the glass type or if exposed coatings are present. A logo may not be visible or present on all heat-treated glass products, so the lack of a logo does not mean the glass is not heat-treated.

High performance windows may be produced with a coating on one or both exposed surfaces. Low-E coatings are typically neutral in color and very difficult to see. Reflective coatings increase the reflectivity of the glass and are normally obvious. Specific glass cleaning procedures must be adhered to when attempting to clean coated glass surfaces. Consult the glass manufacturer's guidelines for specific procedures.

The plastic interlayer in laminated glass is generally exposed around the periphery of the window glass; cleaning fluids and their vapors must be kept away from this area. For cleaning laminated glass, or windows and doors containing laminated glass, do not use anything that is corrosive such as solvents, acids, bases or other chemicals. Examples of some materials that may cause harm include, but are not limited to:

- Bleach (or other solutions containing sodium hypochlorite)
- Acids, especially muriatic/hydrochloric and hydrofluoric (often found in glass cleaning and restoration products)
- Ammonia

Toluene
Xylene
Methyl Ethyl Ketone (a.k.a. MEK)
Acetone
Ethyl Acetate
Mineral Spirits
Turpentine
Methanol
Products with labeling that states they are flammable or corrosive

Contact the laminated glass supplier or interlayer manufacturers for additional recommendations and cautions.

Insulating glass, laminated glass and decorative glass is glazed in many ways, utilizing glazing sealants, gaskets, and/or tapes. Glazing materials do not provide a sufficient barrier to prevent cleaning agents from entering the glazing pocket and damaging the edge of the glass product or affecting the insulating glass unit seal. The presence of weep holes is recommended, but is also not sufficient to overcome the risk of improper cleaning materials coming in contact with the edge of glass products. Exposure to certain chemicals may affect the sealants of insulating glass units and the surface of decorative products. Insulating glass unit longevity may be negatively affected by exposure to certain chemicals. Contact the supplier for additional recommendations and cautions.

The glass industry takes extreme care to avoid glass scratches by protecting glass surfaces during manufacturing and fabrication, as well as during all shipping and handling required to deliver the glass to the end user. A large percentage of damaged glass results from non-glass trades working near glass. They may inadvertently lean tools against the glass, splash materials onto the glass and/or clean the glass incorrectly, any of which can permanently damage glass.

To ensure long-term performance of the glass in a building, GANA and IWCA encourage glazing contractors, general contractors, building management and owners to be diligent in preserving the integrity of glass products. It is important to be aware of conditions that can lead to glass damage, to follow the handling and cleaning guidelines provided by GANA/IWCA and the glass fabricator, and to adhere to a regular schedule of maintenance cleaning. Generally, twice per year cleaning is sufficient; however, specific regions may require more frequent cleaning due to environmental factors and atmospheric pollutants. Contact a professional window cleaner, such as members of the IWCA, to discuss recommended frequencies for your particular building.

Quick-Reference Guide to Cleaning Architectural Glass Products

The following "Do's" and "Don'ts" are offered as a supplement to the GANA Glass Informational Bulletin 01-0116 *Proper Procedures for Cleaning Architectural Glass Products*:

The following are things to DO:

- DO clean glass when dirt and residue appear
- DO protect glass during all stages of construction
- DO determine if coated glass surfaces are exposed
- DO exercise special care when cleaning coated glass surfaces
- DO avoid cleaning tinted and coated glass surfaces in direct sunlight
- DO start cleaning at the top of the building and continue to lower levels
- DO soak the glass surface with a clean water and soap solution to loosen dirt and debris
- DO use a mild, non-abrasive commercial window cleaning solution
- DO use a window-cleaning squeegee to remove all of the cleaning solution
- DO clean one representative window and check to see if procedures have caused any damage
- DO be aware of and follow the glass supplier's specific cleaning recommendations
- DO caution other trades against allowing other materials to contact the glass
- DO watch for and prevent conditions that can damage the glass
- DO read the following GANA Glass Informational Bulletins (GIBs) before cleaning any heat-strengthened or tempered glass products:
 - GANA ID 01-1107 *Describing Architectural Glass Constructions*
 - GANA TD 02-0402 (2008) *Heat-Treated Glass Surfaces Are Different.*
 - GANA 01-0300 *Proper Procedures for Cleaning Architectural Glass Products*
 - GANA TD 03-1003 (2010) *Construction Site Protection and Maintenance of Architectural Glass (in collaboration with IWCA)*

The following are things NOT to do:

- DO NOT start cleaning without reading:
 - GANA ID 01-1107 *Describing Architectural Glass Constructions*
 - GANA TD 02-0402 (2008) *Heat-Treated Glass Surfaces Are Different.*
 - GANA 01-0300 *Proper Procedures for Cleaning Architectural Glass Products*

- GANA TD 03-1003 (2010) *Construction Site Protection and Maintenance of Architectural Glass (in collaboration with IWCA)*

- DO NOT allow dirt and residue to remain on glass for an extended period of time
- DO NOT begin cleaning glass without knowing if a coated surface is exposed
- DO NOT clean tinted or coated glass in direct sunlight
- DO NOT allow water or cleaning residue to remain on the glass or adjacent materials
- DO NOT begin cleaning without rinsing excessive dirt and debris
- DO NOT use abrasive cleaning solutions or materials for maintenance cleaning
- DO NOT ever use razor blades on coated glass surfaces
- DO NOT allow metal parts of cleaning equipment to contact the glass
- DO NOT trap abrasive particles between the cleaning materials and the glass surface
- DO NOT allow other trades to lean tools or materials against the glass surface
- DO NOT allow splashed materials to dry on the glass surface

Consult either the GANA website (www.glasswebsite.com) or the IWCA website (www.iwca.org) for additional information and links providing additional technical resources.

The Glass Association of North America (GANA) has produced this Glass Information Bulletin in cooperation with the International Window Cleaning Association (IWCA) solely to provide general information as to basic proper procedures for cleaning architectural glass products. The Bulletin does not purport to state that any one particular type of glass cleaning process or procedure should be used in all applications, or even in any specific application. The user of this Bulletin has the responsibility to ensure the cleaning instructions from the glass supplier are followed. GANA disclaims any responsibility for any specific results relating to the use of this Bulletin, for any errors or omissions contained in the Bulletin, and for any liability for loss or damage of any kind arising out of the use of this Bulletin.

This bulletin was developed by the GANA Tempering Division and IWCA Glass Committee, and approved by the Tempering Division and GANA Board of Directors.

Residue on Glass

The glass cleaning recommendations in this document are offered by Vitro (formerly PPG Industries) for specific projects with severe residue and dirt build-up and should not be used as standard cleaning procedures.

Glass

For over two thousand years, the lustrous, hard and inert characteristics of glass, coupled with its transparency, have made it one of the world's most desirable and used building materials.

Glass has been successfully used in the construction industry for many years on thousands of projects involving billions of square feet of glass.

NO VITRO GLASS, BY ITSELF, EXUDES, LEACHES OR BLEEDS ANY RESIDUE OR STAIN CAUSING MATERIALS.

Runoff and Glass Damage

When water reaches a building, it is reflected, absorbed into the building materials, or allowed to run down the façade. When this water is permitted to run down over masonry, sealants, and other building materials, and onto the glass, the water can carry with it contaminants that may react with and adhere to the glass surface. These contaminants could lead to a residue that is difficult to remove, a stain that cannot be removed, or the chemical attachment of certain minerals to the glass surface.

The following paragraph was excerpted from Metal Curtain Wall, Window, Store Front and Entrance, Guide Specifications Manual published in 1976 by Architectural Aluminum Manufacturers Association.

"Glass may be damaged, etched or stained by a number of materials typically used at a job site. Surface damage may be caused by weld splatter and wind-blown debris. Alkaline materials such as concrete wash off and certain cleaning agents

may chemically attack the glass surfaces. Rust (iron oxide) will not usually deteriorate the glass surface, but may be very difficult to remove. Silicone concrete sealing materials can discolor glass surfaces; it is a good practice to protect glass surfaces whenever practical during construction of the building. Special attention should be paid to single-glazed reflecting glasses. These are not any more susceptible to damage than uncoated glasses. However, scratches and other damage to the coating are more noticeable."

Silicates

While the above paragraph is generally true, it contains some information that deserves clarification. It states that alkaline materials such as concrete wash off may chemically attack the glass surfaces. What actually happens is this: When rainwater makes contact with a concrete surface, small amounts of silicate material dissolve into the water. If these dissolved silicate solutions are allowed to dry on glass in the building, the result is a tenacious, water-insoluble deposit that is chemically bonded to the glass and resists conventional cleaning agents. The chemical bond occurs as quickly as evaporation to dryness occurs, and is as likely to occur in mid-winter as other seasons. With repeated run down and evaporation of silicate solutions the permanent deposits can build up and become quite unsightly.

Masonry

Staining, and, etching of glass can result from substances released from concrete facades and concrete window frames. Rainfall can permeate concrete, then leach alkaline materials from it, and deposit them on the glass. In some instances, this may cause surface staining and etching.

Concrete frames at window heads should be designed so that any runoff is directed away from the glass. Edge drips and a second drip, as another line of defense, should be provided. Pre-

Residue on Glass

cast panels and all other concrete for outdoor walls should be processed for thorough mixing, full hydration, and complete curing. Concrete surface treatments (with acid, sandblasting, bush-hammering, grouting, waterproofing, etc.) must be completed before glazing begins; any loose particles resulting from these operations should be removed by normal wash, rinse, and dry cleaning.

It is essential that these surface treatments be completed prior to glazing. Vitro's experience verifies that if these surface treatments are performed while glass is in place, the risk of permanent damage to the glass is great, and complete replacement is usually the only practical remedy for damaged glass.

Glass should be examined at least monthly during construction when it is installed adjacent to or below concrete or other masonry surfaces that are exposed to weather. When inspection reveals dirt, scum, and other deposits or staining, glass should be immediately washed.

Sealants

Organic sealants used in today's glazing systems may exude, bleed, or leach solvents, oils and/or plasticizers, etc. under normal weathering conditions.

Depending on the type of sealant used and the weathering conditions encountered, residue from sealants can vary dramatically in content, degree, and the time period over which the residue continues to exude from the sealant. Generally, the degree of residue from sealants will diminish asymptotically over time.

In the great majority of projects, frequent cleaning of glass will remove deposits or residue using normal wash and rinse glass cleaning methods.

When residue from sealants is allowed to remain in contact with glass surfaces over a long period of time without frequent washing of the glass,

the residue may become tenaciously bonded to the surface of the glass due to normal weathering. If the residue is permitted to have a long residence time, very costly cleaning techniques may be required to remove the residue from glass surfaces.

Due to exuding, leaching or bleeding, sealants need not necessarily be in direct contact with glass to produce a residue on glass. Residues from metal expansion joint sealants, parapet sealants, and metal and masonry weather-sealants, may still run down and deposit on the glass surfaces, either by gravity or through the action of rain.

On projects where residue build-up from sealants has occurred, it cannot be Vitro's responsibility to analyze these residues to determine their source, nature or composition. Because there are so many sealants available in the construction industry, Vitro cannot effectively analyze them all, or comment on their performance or recommend their use.

Metals

Weathering steels, for example, release oxides while "aging". These oxide deposits should be removed from glass by regular cleaning methods initiated early during construction. If the metal oxides are permitted to wash over glass and are permitted to accumulate, they can leave a deposit that is tenaciously adhered, requiring costly cleaning techniques to remove the residue from the glass surface.

Residue on Glass

Glass Fabrication Processing Marks

Window fabrication and installation practices utilize many means to process, store, and install the glass. These means are generally used to prevent glass to glass contact or glass damage from occurring, and to safely handle the glass either manually or automatically. These means may include but are not limited to the use of separator pads, conveyor belts, conveyor rollers, brushes, the use of suction cups, etc. While the use of these devices during the fabrication and installation process does not leave a visible residue on the glass surface, they do change the surface condition of the glass which could provide for a visual appearance under certain conditions. For example when water would bead up on the glass surface from either condensation, cleaning or rain, the outline of the processing contact may become visible. The different water beading patterns can create an outline with distinct lines of demarcation which can take the shape of the device that had previously contacted the glass surface in this area.

While this appearance would be noticeable under certain conditions, it does not affect the functionality, performance, or longevity of the glass. It is possible that this condition could dissipate over time with normal exposure to the elements and regular glass cleaning. It may be possible to immediately minimize or remove the surface differences present by following the cleaning procedure in Attachment C. Use caution with this cleaning method, test a small area first, as glass scratching may occur if light pressure is not used.



Photo Above shows an installed window with heavy condensation on Glass. Different patterns are visible within the condensation including the outline of a Vacuum Cup mark which may have been used to handle the glass during fabrication or installation. There are no visible marks present on this glass in the absence of condensation.



Photo Above shows an installed window with heavy condensation on Glass. Different patterns are visible within the condensation including the outline of separator pad marks on glass. As above there are no visible marks present on this glass in the absence of condensation.

Residue on Glass

Cleaning Recommendations

In situations where residue build-up or processing marks may have occurred, building owners and building maintenance supervisors may wish to consider cleaning procedures as indicated in Attachments A, B, and C. Cleaning procedures in Attachments B and C are intended for evaluation by building owners and maintenance supervisors and should be conducted on a selected sample (5 to 10 lites) of glass to determine: (1) their effectiveness and (2) estimated costs.

The cleaning procedures shown on Attachments A, B, and C can be recommended, evaluated, and used on Vitro products with non-low-e coated surfaces. This would include all Vitro clear and tinted products, monolithic *Solarcool*[®] or *Vistacool*[®], and any IG units with Vitro *Solarban*[®], *Sungate*[®], *Solarcool*[®], *Vistacool*[®] coatings facing the airspace of the IG unit.

The indicated glass cleaning procedures have been successfully demonstrated on projects having a rundown residue. However, if the cause of the residue deposit on glass is not corrected, it is likely that recontamination and residue build-up will recur.

After evaluation of these cleaning methods, their costs and effectiveness, it may be found that the only practical remedy for tenaciously bonded residue on glass surfaces is replacement of glass and modification of the glazing system to avoid recontamination.

Design Recommendations

Early in the design stage, architects should consider glazing details designed to avoid water run-off onto glass surfaces. The use of reveals, splays, flashing, drips, etc. from sealants, masonry or metals can minimize run-off and avoid the deposition of residue onto the glass.

Location of water sprinklers in relation to glass surfaces should also be considered early in design. Direct or windblown hard water spray from water sprinklers can produce tenaciously bonded inorganic residues on glass surfaces. If spraying is repeated and/or wet, dry spray cycles are permitted to remain in contact with glass surfaces, for even short periods of time, costly cleaning procedures such as those recommended in Attachment C may be required.

Extended periods of cyclic water spray without frequent cleaning of glass may allow residue build-up to develop which cannot be removed by cleaning procedure in Attachment C. Glass replacement may be the only practical remedy.

Well-designed glazing surrounds that minimize run-off, combined with a review and recommendations from responsible material suppliers, will help eliminate residue build-up. Long-term beauty and performance of glass surfaces that architects and owners have reasonably come to expect over the centuries will thereby be assured.

Residue on Glass

For detailed cleaning procedures

See the following ATTACHMENTS A, B, and C

Residue on Glass

ATTACHMENT A

Recommended Standard Glass Cleaning Procedure

1. Apply mild soap, mild detergent, LEPTYNE®* solvent, xylene, toluene, mineral spirits or naphtha solvents to glass either by spraying or using a clean, grit-free cloth or sponge saturated with cleaning solution. Complete coverage of area to be cleaned is a necessity. For ease in cleaning, an area not exceeding 10 to 15 square feet is recommended. When using solvents, be careful not to damage glazing or insulating unit seals by overgenerous application of solvent. In addition, comply with solvent manufacturer's directions on label for toxicity, handling and flammability warnings.
2. Wipe the above cleaning solutions on the glass in a circular motion, applying light to moderate pressure; Approximately 3 to 5 passes of the affected area may be required to remove the residue. Fewer or more passes may be required, depending on the adhesion and severity of the residue.
3. Rinse the glass surface immediately with generous amounts of clean water, removing the cleaning solution from the glass surface.
4. Using a squeegee or clean, lint-free dry cloth, remove water from the glass surface.
5. If glass residue is still evident, repeat steps 1, 2, 3, and 4.

Important Notes:

1. Do not clean glass when glass is exposed to direct sunlight.
2. Glass should be cleaned by starting at the top of the building, systematically working down to glass installed on lower levels. This technique reduces the possibility of residue and cleaning solution rundown on glass previously cleaned.

*LEPTYNE® is a registered trademark of PPG Industries, Inc.

The glass cleaning recommendations in this document are offered by Vitro for specific projects with severe residue and dirt build-up and should not be used as standard cleaning procedures.

Residue on Glass

ATTACHMENT B

Recommended Glass Cleaning Procedure with RD-10 Detergent

For Evaluation by Building owner or Maintenance Supervisor

1. Make a solution of RD-10 detergent and water, 1 part by volume RD-10 to 5 parts tap water.
2. Apply RD-10 solution on glass by spraying, or using a hand pump spray bottle. Using a soft damp cloth lightly spread the RD-10 water solution over an area of 10 to 15 square feet. Complete coverage of area to be cleaned is a necessity. For ease in cleaning, an area not exceeding 10 to 15 square feet is recommended.
3. Leave RD-10 solution on glass for 30 seconds to 1 minute.
4. With a damp, clean lint-free cloth, wipe the RD-10 solution on the glass in a circular motion, applying light to moderate pressure. Approximately 3 to 5 passes of the affected area may be required to remove the residue. Fewer or more passes may be required, depending on the adhesion and severity of the residue.
5. Rinse the glass surface immediately with generous amounts of water, cleaning off all RD-10 solution from the glass.
6. Using a squeegee or clean lint-free dry cloth, remove water from the glass surface,
7. If glass residue is still evident, repeat steps 2, 3, 4, 5, and 6.

Important Notes:

1. Do not clean glass when glass is exposed to direct sunlight.
2. Glass should be cleaned by starting at the top of the building, systematically working down to glass installed on lower levels. This technique reduces the possibility of residue and cleaning solution rundown on glass previously cleaned.

RD-10 detergent can be obtained from:

The Rockland Corporation
12215 E. Skelly Drive
Tulsa, Oklahoma, 74128
(918) 437-RD10

The glass cleaning recommendations in this document are offered by Vitro for specific projects with severe residue and dirt build-up and should not be used as standard cleaning procedures.

Residue on Glass

ATTACHMENT C

Recommended Glass Cleaning Procedure with Cerium Oxide

For Evaluation by Building Owner or Maintenance Supervisor

1. If using Cerium Oxide powder, make a paste with the Cerium Oxide and water approximately 3 parts Cerium Oxide to 1 part water.
2. If using the Cerium Oxide paste, use the paste directly from the container.
3. Using a clean, lint-free cloth, wipe the Cerium Oxide paste on the glass in a circular motion with light pressure (two to four pounds). Cerium Oxide is an abrasive and, therefore, scratching could result if light pressure is not used. For ease in cleaning, an area not exceeding five square feet is recommended. Approximately three to five passes of the affected area may be required, depending on the adhesion and severity of the residue.
4. Rinse the glass surface immediately after Cerium Oxide cleaning with generous amounts of clean water, removing the Cerium Oxide paste from the glass
5. Using a squeegee or clean, lint-free dry cloth, remove water from the glass surface
6. If glass residue is still evident, repeat steps 3, 4, and 5
7. For evaluation of fabrication processing marks, lightly mist the surface with clean water. If marking is still evident, repeat steps 3, 4, and 5.

Only optical grade Cerium Oxide should be used, which can be obtained from chemical supply companies. A source for Cerium Oxide is:

1. Universal Photonics, Inc.
85 Jetson Lane
Central Islip, NY 11722
(516) 935-4000
Powder Part Number BA2018NS - Unicer 18, (1pound package - Powder)
Paste Part Number BA2018PASTE – Unicer 18, (1pound container – Paste)

Important Notes:

1. Do not clean glass when glass is exposed to direct sunlight
2. Recommended to clean glass by starting at the top of the building, systematically working down to glass installed on lower levels. This technique reduces the possibility of residue and cleaning solution rundown on glass previously cleaned.

The glass cleaning recommendations in this document are offered by Vitro for specific projects with severe residue and dirt build-up and should not be used as standard cleaning procedures.

Residue on Glass

HISTORY TABLE		
ITEM	DATE	DESCRIPTION
Original Publication	11/30/1981	
Revision #1	1/10/2002	Revised & transferred to TD-107
Revision #2	11/6/2006	Added Glass Fabrication Processing Marks section and pictures.
Revision #3	10/4/2016	Updated to Vitro Logo and format
Revision #4	1/4/2018	Updated Cerium Oxide source in Attachment C, removed reference to SG300 and SG500 on page 4.

This document is intended to inform and assist the reader in the application, use, and maintenance of Vitro Flat Glass products. Actual performance and results can vary depending on the circumstances. **Vitro makes no warranty or guarantee as to the results to be obtained from the use of all or any portion of the information provided herein, and hereby disclaims any liability for personal injury, property damage, product insufficiency, or any other damages of any kind or nature arising from the reader's use of the information contained herein.**



APPENDIX C



June 27, 2023

Lucas Boselli, EVP, North America
Assa Abloy
110 Sargent Drive
New Haven, CT 06511

By mail and email

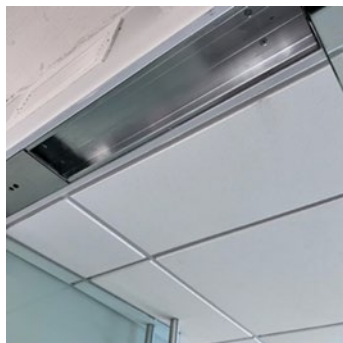
Dear Mr. Boselli:

The Office of the D.C. Auditor (ODCA) has recently occupied newly constructed office space that uses Assa Abloy hardware on our office and entrance doors. I write to ask whether our contractors have taken all appropriate steps to ensure appropriate use of the company's materials.

Specifically, our interior offices use the DS 3000 Single Acting Door Stop, OHC Overhead Concealed Door Closer, and associated Assa Abloy equipment to allow for the opening, closing, and locking of our office glass doors. Our doors have a recessed header with a metal "snap-in" plate to which the DS 3000 is attached.

On several occasions prior to and since occupancy, the metal plates in multiple doorways have fallen from their housings. See the image on the right.

The architect, builder, and installer have asserted that the glass office doors were installed according to Assa Abloy's specifications. See the image below.



Because of the failures, we asked our contractor and glass installer to further secure the door stopper assembly. The contractor chose to attach each DS3000 to the recessed header using 3" screws into the upper edge of the header. See the image at right.



Though there have been no further instances of failure from the assembly, we would like your assurance that this method of securing is appropriate to ensure against additional failures.



I would appreciate a timely reply, and should you need further information, please contact me at kathy.patterson@dc.gov or my chief of staff, Eric Rogers, at eric.rogers@dc.gov. Thank you for your consideration.

Sincerely yours,

A handwritten signature in blue ink that reads "Kathy Patterson". The signature is written in a cursive, flowing style.

Kathy Patterson
D.C. Auditor

July 13, 2023

Kathy Patterson
ODCA Office of D.C. Auditor
717 14th Street, N.W.
Suite 900
Washington, DC 20005

Dear Ms. Patterson,

I want to thank you for choosing ASSA ABLOY products for your opening. It is unfortunate that this issue has occurred.

The 3" long screws which your contractor has installed is exactly what is needed for this mounting application. This will securely hold the stop to the header, and you should not have any future failures from the stops causing the bottom plate to fall out.

Please feel free to reach out to me if you ever have any questions about the ASSA ABLOY Glass Solutions products.

Sincerely,



Melissa Thompson
Glass Solutions Engineer



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