SECTION 080671
DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:
   1. Swinging doors.
   2. Sliding Doors.
   3. Other doors to the extent indicated.

B. Commercial door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical and access control door hardware.
   3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
   4. Automatic operators.
   5. Cylinders specified for doors in other sections.

C. Related Sections:
   1. Division 08 Section “Hollow Metal Doors and Frames”.
   2. Division 08 Sections “Flush and Clad Wood Doors”.
   3. Division 08 Section “Door Hardware”.
   4. Division 26 Sections “Electrical”.
   5. Division 28 Section “Access Control”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.

E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

A. 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. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate selection for the material and application.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.

1. Section 08 41 26 – All Glass Entrances.
2. Section 08 71 00 – Door Hardware.
3. Section 28 15 00 – Access Control Hardware Devices.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. RF - Rixson
6. NO - Norton
7. GS - ASSA ABLOY Glass Solutions
8. SU - Securitron

Hardware Sets

Set: 1.0
Doors: 301
Description: Fail Secure Pair - Cont Hinge

2	Continuous Hinge	CFMxxSLF-HD1 EL-CEPTx32D		PE	087100
1	Removable Mullion	L980	PC	SA	087100
1	Fail Secure Exit Device	DG264 55 8876-24v ETMG	US32D	SA	087100
1	Rim Exit Device, Exit Only	55 8810 EO	US32D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100

2	Surface Closer	UNI9500	689	NO	087100
1	Threshold	to architect detail		PE	087100
1	Gasketing	290APK x 2891APK		PE	087100
1	Meeting Stile	S772BL		PE	087100
2	ElectroLynx Harness - Frame	QC-C1500		MK	087100
2	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Wiring Diagram	WD-SYSPK		SA	087100
2	Switch	3287		SA	087100
1	Hub	AH20W14		SA	087100
1	Credential Reader	RD-R100H-IPS	Black	GS	084126
1	Power Distribution Board	AQL Series with relays		SU	087100

Notes: Doors shall be normally closed and locked.
Authorized entry by valid credential read at active leaf.
Opening the door from the outside by mechanical key over ride will activate the concealed switch (alarm).
Depressing push bar in the path of egress either leaf will activate the request to exit switch.
Free egress at all times.
Exit device trim will be locked with loss of power.

Set: 1.1
Doors: 302
Description: Aluminum Push Bar & Pull - Pair

2	Continuous Hinge	CFMxxSLF-HD1		PE	087100
2	Push Bar & Pull	BF15747	US32D	RO	087100
2	Door Closer	UNI7500	689	NO	087100

Set: 2
Doors: 101, 118, 330
Description: Fail Secure exit device - single - cont hinge

1	Continuous Hinge	CFMxxSLF-HD1 EL-CEPTx32D		PE	087100
1	Fail Secure Exit Device	DG264 55 8876-24v ETMG	US32D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Surface Closer	UNI9500	689	NO	087100
1	Threshold	to architect detail		PE	087100
1	Gasketing	S773BL		PE	087100
1	ElectroLynx Harness - Frame	QC-C1500		MK	087100
1	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Wiring Diagram	WD-SYSPK		SA	087100
1	Switch	3287		SA	087100
1	Hub	AH20W14		SA	087100
1	Credential Reader	RD-R100H-IPS	Black	GS	084126
1	Power Distribution Board	AQL Series with relays		SU	087100

Notes: Doors shall be normally closed and locked.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key over ride will activate the concealed switch (alarm).
Depressing push bar in the path of egress will activate the request to exit switch.
Free egress at all times.

Exit device trim will be locked with loss of power.

Set: 2.1
Doors: 320A
Description: Aluminum Push Bar & Pull Single

1	Continuous Hinge	CFMxxSLF-HD1		PE	087100	
1	Push Bar & Pull	BF15747	US32D	RO	087100	
1	Door Closer	UNI7500	689	NO	087100	

Set: 3
Doors: 117A, 122, 309C, 310, 315A
Description: Fail Secure Single Exterior

1	Continuous Hinge	CFMxxSLF-HD1 EL-CEPTx32D		PE	087100	
1	Electrified Mortise Lock	DG264 IDP NAC-82271-24v CEMG	US32D	SA	087100	
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100	
1	Surface Closer	UNI9500	689	NO	087100	
1	Threshold	to architect detail		PE	087100	
1	Gasketing	290APK x 2891APK		PE	087100	
1	Door Bottom	420ASL		PE	087100	
1	Sweep	18061CNB		PE	087100	
1	ElectroLynx Harness - Frame	QC-C1500		MK	087100	1
	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100	
1	Wiring Diagram	WD-SYSPK		SA	087100	
1	Switch	3287		SA	087100	
1	Hub	AH20W14		SA	087100	
1	Credential Reader	RD-R100H-IPS	Black	GS	084126	
1	Power Distribution Board	AQL Series with relays		SU	087100	

Notes: Door shall be normally closed and locked.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.
In the event of an emergency or power failure the door will be locked.

Electric strikes and cylindrical locks are the least secure option available. Electrified mortise locks specified as best option.

Set: 3.1
Doors: 114A, 115A
Description: Exterior Passage single

3	Hinge, Full Mortise	TA314 FT	US32D	MK	087100
1	Passage Latch	8215 CEMG	US32D	SA	087100
1	Door Closer	UNI7500	689	NO	087100
1	Threshold	to architect detail		PE	087100
1	Gasketing	290APK x 2891APK		PE	087100
1	Door Bottom	420ASL		PE	087100
1	Sweep	18061CNB		PE	087100

Set: 4
Description: Fail Secure pair - Exterior

2	Continuous Hinge	CFMxxSLF-HD1 EL-CEPTx32D		PE	087100
1	Electrified Multi-Point Lock	DG264 12 NB 53 55 707415 ETMG	US26D	SA	087100
1	Multi-Point Lock	DG264 12 NB 53 55 700615 ETMG	US26D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
2	Surface Closer	UNI9500	689	NO	087100
1	Threshold	to architect detail		PE	087100
1	Gasketing	290APK x 2891APK		PE	087100
2	Door Bottom	420ASL		PE	087100
2	Sweep	18061CNB		PE	087100
1	ElectroLynx Harness - Frame	QC-C1500		MK	087100
1	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Wiring Diagram	WD-SYSPK		SA	087100
2	Switch	3287		SA	087100
1	Hub	AH20W14		SA	087100
1	Credential Reader	RD-R100H-IPS	Black	GS	084126
1	Power Distribution Board	AQL Series with relays		SU	087100

Notes: Doors shall be normally closed and locked.
Authorized entry by valid credential read on the active leaf.
Opening the door from the outside by mechanical key over ride on the inactive leaf will activate the concealed switch (alarm).
Turning the inside lever handle in the path of egress will activate the request to exit switch.
Free egress at all times.

Set: 5
Doors: 111, 129
Description: Fail Secure pair - occupied space

6	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Flush Bolt w/Fire Bolt	2949	US26D	RO	087100
1	Access Control Mort Lock	DG264 IN100-7978 IPS E4MG	US26D	SA	281500
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Mounting Bracket	2601 (size required)	Black	RO	087100
1	Coordinator	2600 Series	Black	RO	087100
2	Surface Closer	9500/ P9500	689	NO	087100
2	Wall Stop	RM867	US15	RO	087100
1	Hub	AH20W14		SA	087100

Notes: Door shall be normally closed and locked.
Inactive leaf will be fastened by means of constant latching flush bolts.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.

Set: 6
Doors: 314

Description: Fail Secure pair - occupied space with magnetic holders

6	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Flush Bolt w/Fire Bolt	2949	US26D	RO	087100
1	Access Control Mort Lock	DG264 IN100-7978 IPS E4MG	US26D	SA	281500
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Mounting Bracket	2601 (size required)	Black	RO	087100
1	Coordinator	2600 Series	Black	RO	087100
2	Surface Closer	9500/ P9500	689	NO	087100
2	Electromagnetic Holder	998	689	RF	087100
1	Hub	AH20W14		SA	087100

Notes: Door shall be normally closed and locked.
Inactive leaf will be fastened by means of constant latching flush bolts.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.

Set: 7
Doors: 106
Description: Fail Secure pair - occupied space

6	Heavyweight Hinge	TA786 FT	US26D	MK	087100
1	Flush Bolt w/Fire Bolt	2949	US26D	RO	087100
1	Access Control Mort Lock	DG264 IN100-7978 IPS E4MG	US26D	SA	281500
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Coordinator	2600 Series	Black	RO	087100
2	Surface Closer	9500/ P9500	689	NO	087100
2	Wall Stop	RM867	US15	RO	087100
1	Hub	AH20W14		SA	087100

Notes: Door shall be normally closed and locked.
Inactive leaf will be fastened by means of constant latching flush bolts.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.

Set: 8
Doors: 317
Description: Classroom function pair - occupied space

6	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
2	Multi-Point Lock	DG264 12 NB 701315 ETMG	US26D	SA	087100
2	Cylinder	complete/ permanent core as req'd	US15	SA	087100
2	Surface Closer	9500/ P9500	689	NO	087100
2	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100
1	Meeting Stile	S772BL		PE	087100

Set: 9
Doors: 309B
Description: Push pull - Deadlock - OH stops

6	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Classroom Deadlock	DG264 4877	US26D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
2	Push Plate	70C	US32D	RO	087100
2	Door Pull	108	US32D	RO	087100
2	Conc Overhead Stop	2-X36	630	RF	087100
2	Surface Closer	9500/ P9500	689	NO	087100
2	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100

Set: 10
Doors: 128, 128A
Description: Passage exit device - Single

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Rim Exit Device, Passage	12 8815 ETMG	US32D	SA	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Wall Stop	RM867	US15	RO	087100
3	Silencer	608		RO	087100

Set: 11
Doors: 102, 116, 120, 126, 203, 306, 307, 308, 309, 311, 313, 315, 316A, 316B, 320, 323, 325, 326, 327, 328, 329, 329A, 331, 332, 332A
Description: IN100 Fail Secure Single

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Access Control Mort Lock	DG264 IN100-7978 IPS E4MG	US26D	SA	281500
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Gasketing	S773BL		PE	087100
1	Hub	AH20W14		SA	087100

Notes: Door shall be normally closed and locked.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.
In the event of an emergency or power failure the door will be locked.

Set: 12
Description: IN100 Fail Secure Single

3	Heavyweight Hinge	TA786 FT	US26D	MK	087100
1	Access Control Mort Lock	DG264 IN100-7978 IPS E4MG	US26D	SA	281500
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
1	Surface Closer	9500/ P9500	689	NO	087100

1	Gasketing	S773BL		PE	087100
1	Hub	AH20W14		SA	087100

Notes: Door shall be normally closed and locked.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.
In the event of an emergency or power failure the door will be locked.

Set: 13
Description: Fail Safe Single

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Hinge, Full Mortise	TA714 FT QC12	US26D	MK	087100
1	Electrified Mortise Lock	DG264 IDP NAC-82270-24v CEMG	US32D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Gasketing	S773BL		PE	087100
1	ElectroLynx Harness - Frame	QC-C1500		MK	087100
1	ElectroLynx Harness - Door	QC-CXXX (Size as required)		MK	087100
1	Wiring Diagram	WD-SYSPK		SA	087100
1	Hub	AH20W14		SA	087100
1	Credential Reader	RD-R100H-IPS	Black	GS	084126
1	Power Distribution Board	AQL Series with relays		SU	087100

Notes: Door shall be normally closed and locked.
Authorized entry by valid credential read.
Opening the door from the outside by mechanical key will activate the concealed switch (alarm).
Rotating the lever handle from the inside will activate the request to exit switch.
Free egress at all times.
In the event of an emergency or power failure the door will be unlocked.

Set: 14
Doors: 104
Description: Classroom with closer

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Classroom Lock	DG264 8237 CEMG	US32D	SA	087100
1	Cylinder	complete/ permanent core as req'd	US15	SA	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100

Set: 15
Doors: 130, 201, 201A, 202, 207, 209
Description: Storeroom with closer

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Storeroom Lock	DG264 8204 LNMD	US26D	SA	087100

1	Surface Closer	9500/ P9500	689	NO	087100
1	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100

Set: 16
Doors: 105, 107, 108, 109, 110, 112, 113, 114, 115, 117, 118B, 119, 123, 204, 312, 316, 322, 324, 327A, 328A
Description: Passage with closer

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Passage Latch	8215 CEMG	US32D	SA	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100

Set: 17
Doors: 123A
Description: Passage with closer and magnetic holder

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Passage Latch	8215 CEMG	US32D	SA	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Electromagnetic Holder	998	689	RF	087100
1	Gasketing	S773BL		PE	087100

Notes: Doors will be held open by means of magnetic holders when desired. In the event of a fire alarm the magnetic holders will automatically release to close the door.

Set: 18
Doors: 103, 121, 127, 318, 319
Description: Single privacy with closer

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
1	Privacy Lock	V20 8266 CEMG	US32D	SA	087100
1	Surface Closer	9500/ P9500	689	NO	087100
1	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100

Set: 19
Doors: 303, 304
Description: Push pull bathroom with operator

3	Hinge, Full Mortise	TA714 FT	US26D	MK	087100
2	Pull	RM2110-12	US32D	RO	087100
1	Automatic Operator	5610	689	NO	087100
1	Kick Plate	K1050 10" high BEV CSK	US32D	RO	087100
1	Wall Stop	RM867	US15	RO	087100
1	Gasketing	S773BL		PE	087100
2	Wave ADA Actuator	700		NO	087100

Notes: Door will be normally closed and unlatched.
Wave sensor ADA actuator on either side will engage automatic operator.

Set: 20
Doors: 101A, 101B, 101C, 101D, 101E, 309A, 311A
Description: Cylinder only

1	Cylinder	complete/ permanent core as req'd	US15	SA	087100

Set: 21
Description: Misc. Tools

1	Crimp Tool	QC-R003		MK	087100
1	Test Unit	WT2		SA	087100
1	Repair Kit	QC-R001		MK	087100
1	Extractor Tool	QC-R002		MK	087100

END OF SECTION 080671

SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated hollow metal doors and frames.

D. Hollow metal borrowed lites glazing frames.

E. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware.

B. Section 088000 - Glazing: Glass for doors and borrowed lites.

C. Section 081416 - Flush Wood Doors.

D. Section 281300 - ACCESS CONTROL.

E. Section 099113 - Exterior Painting: Field painting.

F. Section 099123 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

A. ANSI: American National Standards Institute.

B. ASCE: American Society of Civil Engineers.

C. HMMA: Hollow Metal Manufacturers Association.

D. NFPA: National Fire Protection Association.

E. SDI: Steel Door Institute.

F. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2007 (R2011).

C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.

D. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2003 (R2009).

E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.

F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable 2018.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.

J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.

K. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

L. ITS (DIR) - Directory of Listed Products current edition.

M. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.

N. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.

O. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.

P. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.

Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.

R. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2019.

S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.

T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2013.

U. UL (DIR) - Online Certifications Directory Current Edition.

V. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

W. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.

2. Indicate coordination of glazing frames and stops with glass and glazing requirements.

3. Locations of reinforcement and preparations for hardware.

4. Details of anchorages, joints, field splices, and connections.

5. Details of conduit and preparations for power, signal, and control systems.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

F. Label Construction Certification: For door assemblies required to be fire-rated and exceeding limitations of labeled assemblies, submit manufacturer’s certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three yearsdocumented experience.

B. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

C. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

D. Maintain at project site copies of reference standards relating to installation of products specified.

E. Provide doors and frames complying with Steel Door Institute “Recommended Specifications Standard Steel Doors and Frames” ANSI A250.8 and as herein specified.

F. Membership in good standing in the Steel Door Institute is required. Architect reserves the right to require proof of membership prior to accepting any items described by or related to this Section.

G. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.

2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

3. Smoke Control Door Assemblies: Comply with NFPA 105.

    a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

H. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

I. Hot-Rolled Steel Sheets and Strips: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A1011 / A1011M, free of scale, pitting, or surface defects.

J. Pre-installation Conference: Conduct conference at Project site.

1. Meet with Architect, electrical contractor, security systems supplier, and hardware installers whose work interfaces with or affect hollow metal doors and frames.

2. Review requirements for type of cut-out and back-box as part of the door and frame assembly.

3. Document proceedings, including receipt of samples and approved shop drawings of security contact devices which accurately represent the installation of the device, backbox, and conduit terminations required.

K. Distribute an installation book, including all manuals and instructions.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

C. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

D. Store doors, and frames in a vertical position on blocking, clear of floor and with blocking between doors to permit air circulation between doors.

E. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

F. Carefully protect frames from twisting or racking and preserve the integrity of spreader bars.

G. Immediately remove from job site all damaged or otherwise unsuitable door, and frame.

1.08 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.09 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:

1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com. (C)

2. Mesker Door, Inc.: www.meskerdoor.com (MZ)

3. Republic Doors: www.republicdoor.com. (RP)

4. Steelcraft, an Allegion brand: www.allegion.com/us. (S)

5. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

2. Accessibility: Comply with ICC A117.1 and ADA Standards.

3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.

4. Door Edge Profile: Manufacturers standard for application indicated.

5. Typical Door Face Sheets: Flush.

6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.

7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

   a. Based on NAAMM HMMA Custom Guidelines: Provide at least A25/ZF75 (galvannealed) for interior applications, and at least A60/ZF180 (galvannealed) or G60/Z180 (galvanized) for corrosive locations.

9. Thickness: 1-3/4 inches unless otherwise noted.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements

conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Interior Doors, Non-Fire Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 2 - Heavy-duty.

b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.

c. Model 1 - Full Flush.

d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

2. Door Thickness: 1-3/4 inches, nominal.

3. Door Face Sheets: Flush.

4. Door Finish: Factory primed and field finished.

B. Fire-Rated Doors:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

a. Level 2 - Heavy-duty.

b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.

c. Model 1 - Full Flush.

d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.

2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").

a. Provide units listed and labeled by UL (DIR) or ITS (DIR).

b. Attach fire rating label to each fire rated unit.

c. Smoke and Draft Control Doors(Indicated as "Smoke" on the Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;

1) Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.

2) Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.

3) Label: Include the "S" label on fire-rating label of door.

3. Door Thickness: 1-3/4 inches, nominal.

4. Door Finish: Factory primed and field finished.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Interior Door Frames, Non-Fire-Rated: Mitered, knock-down type except fully welded at masonry wall openings.

1. Grade:

a. Level 3: 14 gage for frames in masonry openings.

b. Level 3:16 gauge for frames in stud openings.

2. Frame Finish: Factory primed and field finished.

3. Weatherstripping: Integral, recessed into door frame, kerf-type, where indicated on the Drawings.

4. Manufacturers Basis of Design:

a. CECO Door Products (C) - BQ Series.

b. CECO Door Products (C) - SQ Series.

c. CECO Door Products (C) - Kerfed Weatherstripped BQW SQW Series.

C. Interior Door Frames, Fire-Rated: Mitered, knock-down type except fully welded at masonry wall openings.

1. Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

2. Grade:

a. Level 3: 14 gage for frames in masonry openings.

b. Level 3:16 gauge for frames in stud openings.

3. Fire Rating: Same as door, labeled.

4. Frame Finish: Factory primed and field finished.

5. Weatherstripping: Integral, recessed into door frame, kerf-type, where indicated on the Drawings.

D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

E. Mullions for Pairs of Doors: Fixed, with profile similar to jambs.

F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

G. Transom Bars: Fixed, of profile same as jamb and head.

H. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

I. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

J. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

2.05 LIGHT OPENINGS AND GLAZING

A. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

B. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

C. B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

D. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

E. D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.06 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

1. Primer is to be applied in the factory by the frame manufacturer.

B. Bituminous Coating: Cold-applied asphalt mastic, emulsion or other high-build, water-resistant, non-fibered, resilient coating with a minimum 15-mil dry film thickness, tested in accordance with UL 10C. Provide in all frames where frames are fully grouted with an approved Portland Cement based grout or mortar.

1. Bitiminous coating is to be applied in the factory by the frame manufacturer.

2. Manufacturers:

a. Henry 107 Asphalt Emulsion sealer and damproofer; www.us.henry.com

b. Wohl Coatings BB-99 Bituminous Black Pipe Coating; www.wohlcoatings.com

3. Substitutions: See Section 016000 - Product Requirements.

2.07 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Masonry Type: Provide expansion bolt anchors where indicated on the drawings. Provide dimple in frame at each bolt location.

3. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

4. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.08 ACCESSORIES

A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.

1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.

2. Style: Sightproof inverted Y blade.

3. Louver Free Area: 50 percent.

4. Fasteners: Exposed tamper proof fasteners.

B. Glazing: As specified in Section 088000, factory installed.

C. Astragals for Double Doors: Specified in Section 08 7100.

D. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

E. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

F. Grout for Frames: **Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.**

G. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

H. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.09 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.

2. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

3. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Welded Frames: At all Exterior locations and Interior Masonry construction: Weld joints continuously through full throat width of frames, including rabbets, soffits, and stops; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Knocked Down Frames: At interior stud wall construction: (except for sidelite units) Provide frames with locking corner tabs which permit field assembly. Factory install compression type anchors and countersunk screw holes to secure the bottom of the jambs.

4. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

5. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.

6. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.

7. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

8. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.

9. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

10. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".

    a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.

    b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.

    c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".

    d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.

11. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

12. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.

        2) Three anchors per jamb from 60 to 90 inches high.

        3) Four anchors per jamb from 90 to 120 inches high.

        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.

        2) Four anchors per jamb from 60 to 90 inches high.

        3) Five anchors per jamb from 90 to 96 inches high.

        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

13. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

B. Immediately after erection, sand smooth any rusted or damaged areas of factory prime coat. Apply touch-up of compatible air-drying primer, providing for a continuous unbroken primer coating.

C. Prior to installation, paint hidden surfaces of frames installed in interior walls in rooms where there might be water on the floor, such as bathrooms and kitchens, with an additional primer coat from floor level to 48-inches above finish floor.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 087100.

F. Erect frames plumb, level, and square; free of racking, warping, or bowing; for effort free door operation and without gravity imposed movement upon door anywhere within door swing.

G. Except for frames located at existing concrete, masonry or drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

H. In masonry construction, locate three (3) wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb.

I. In metal stud partitions, install at least three (3) wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.

J. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

K. Cover exposed fastener heads with epoxy metal filler. Finish smooth and level with frame.

L. Coordinate installation of electrical connections to electrical hardware items.

M. Touch up damaged factory finishes.

N. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.

b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.

c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

B. Adjust sound control doors so that seals are fully engaged when door is closed.

C. Remove grout and other bonding material from hollow metal work immediately after installation.

D. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.06 TESTING

A. Testing shall be in accordance with Section 019020 - Enclosure Commissioning Requirements.

3.07 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 081416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire rated and non-rated.

1.02 RELATED REQUIREMENTS

A. Section 080671 - Door Hardware Schedule

B. Section 081113 - Hollow Metal Doors and Frames.

C. Section 087100 - Door Hardware.

D. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ICC A117.1 - Accessible and Useable Buildings and Facilities

C. ANSI A208.1 - American National Standard for Particleboard 2016.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards 2014, with Errata (2018).

E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1 2017, with Errata (2019).

F. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

G. ITS (DIR) - Directory of Listed Products current edition.

H. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.

I. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.

J. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.

K. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

L. WDMA I.S. 1A - Interior Architectural Wood Flush Doors 2013.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.

2. Indicate coordination of glazing frames and stops with glass and glazing requirements.

3. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

E. Samples: Submit two samples of manufacturer's full line of standard finishes for Architect selection.

F. Specimen warranty.

G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

C. Quality Certification:

1. Provide labels or certificates indicating that the installed work complies with WDMA I.S.1-A or AWMAC/WI (NAAWS) requirements for grade or grades specified.

2. Provide designated labels on shop drawings as required by certification program.

3. Provide designated labels on installed products as required by certification program.

4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

D. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40” above sill) or UL10C.

1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.

2. Temperature Rise Limit: Where required and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.

3. Smoke Control Door Assemblies: Comply with NFPA 105.

    a. Smoke Label: Doors to bear " S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

D. Mark each door on top and bottom rail with opening number used on Shop Drawings

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC System is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

D. Contractor's Responsibilities: Replace or refinish doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:

1. ASSA ABLOY Wood Doors (GR): GPD Series.
2. Haley Brothers: www.haleybros.com.
3. Marshfield-Algoma (MF): www.marshfielddoors.com: Signature Series.
4. VT Industries (VT): Artistry Series.
5. Substitutions: See Section 016000 - Product Requirements.

2.02 DOORS

A. Doors: See drawings for locations and additional requirements.

1. Quality Standard: Premium Grade, Extra Heavy Duty performance, in accordance with WDMA I.S. 1A.
2. Quality Level at Public Toilets, Janitor's Closets, and Assembly Spaces: Custom Grade, Extra Heavy Duty performance, in accordance with WDMA I.S.1-A.
3. Quality Level at Closets (not including Janitor's Closets) : Premium Grade, Standard Duty performance, in accordance with WDMA I.S.1-A.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC) complying with ANSI A208.1 Particleboard standard. Grade LD-2, plies and faces as indicated.

1. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.

B. Fire Rated Doors over 20 minute rating: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 BLOCKING

A. Fire Rated Doors:

1. Provide blocking as indicated below:
   a. HB1: 5 inch in doors indicated to have closers and overhead stops.
   b. HB2: 5 inch bottom rail blocking in doors indicated to have kick plates.
   c. HB3: 5 inch top and bottom rail blocking in doors indicated to have closers and kick plates.
   d. HB4: Two 5 inch x 14 inch lock blocking in doors indicated to have exit devices.
   e. HB5: Two 5 inch x 14 inch corner blocking in doors indicated to have flush bolts.

f. HB6: 5 inch mid-rail blocking in doors indicated to have exit devices.

g. HB7: 5 inch stile blocking.

h. HB8: Two 5 inch x 14 inch corner blocking and two 5 inch x 14 inch lock blocking on doors to have vertical rod exit devices.

2.05 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), A grade, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

1. Vertical Edges: Same species as face veneer.

2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.

3. Color: As selected by Architect from full range of manufacturer colors.

2.06 ACCESSORIES

A. Glazing Stops in Fire Rated Doors: 18 gauge, Rolled steel channel shape, {CH#49104} corners, factory-primed; prepared for countersink style tamper proof screws.

B. Glazing Stops in Non-Rated Doors: Wood, of same species as door facing, {CH#48867} corners, factory-stained to match doors; prepared for countersink style tamper proof screws.

2.07 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

1. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.

2. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.

3. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

F. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

2.08 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with WDMA I.S. 1A or AWMAC/WI (NAAWS), Finishing for grade specified and as follows:

1. Transparent:

a. System - 9, UV Curable, Acrylated Epoxy, Polyester or Urethane.

b. Stain: As selected by Architect.

c. Sheen: Satin.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work. Examine doors, with the Installer present, and reject doors with defects.

B. Verify that opening sizes and tolerances are acceptable, in compliance with specified requirements for type, size, location, swing characteristics, and are installed with level heads and plumb jambs.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

D. Correct unsatisfactory conditions and deficiencies prior to door installation.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

1. Install fire-rated doors in accordance with NFPA 80 requirements.

2. Install smoke and draft control doors in accordance with NFPA 105 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

F. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 PROTECTION

A. Protect doors, as recommended by door manufacturer, to ensure that doors will be without damage and deterioration at time of Substantial Completion.

3.06 SCHEDULE

A. Refer to Door and Frame Schedule in the drawings.

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END OF SECTION

SECTION 083100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling mounted access units.

1.02 RELATED REQUIREMENTS

A. Section 099000 - PAINTING AND COATING: Field paint finish.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.

E. Project Record Documents: Record actual locations of each access unit.

1.04 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Warrant materials and workmanship against defects after completion and final acceptance of Work.

1. Access Doors: one year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Wall-Mounted Units with Return Air Grille:

1. Material: Steel.

2. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.

B. Wall-Mounted Units in Wet Areas:

1. Material: Stainless steel, Type 304.

2. Size: 12 by 12 inches.

3. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.

C. Fire-Rated Wall-Mounted Units:

1. Wall Fire-Rating: As indicated on drawings.

2. Panel Material: Steel.

3. Size: 12 by 12 inches.

D. Ceilings for attic access:

1. Material: Insulated Wood.

2. R-Value: R-42 Minimum

3. Size in Ceilings: 20" x 30" inches, unless otherwise indicated.

E. Ceilings, for mechanical access:

1. Material: Steel.

2. Size: 16 x 16 inches, unless otherwise indicated.

3. Standard duty, hinged door.

4. Tool-operated spring or cam lock; no handle.

F. Fire Rated Ceilings, for mechanical access: See drawings for ceiling fire ratings.

1. Panel Material: Steel.

2. Size: 16 inch by 16 inch.

3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 WALL UNITS

A. Manufacturers:

1. ACUDOR Products Inc: www.acudor.com/#sle.

a. Air-Tight, Water-Tight, Wall and Ceiling Mounted Units: ACUDOR ADWT.

b. Fire-Rated Wall-Mounted Units - 2 Hours or Less: ACUDOR FW-5015.

2. Babcock-Davis: www.BabcockDavis.com.

3. Milcor, Inc: www.milcorinc.com.

4. Substitutions: See Section 016000 - Product Requirements.

2.03 CEILING UNITS FOR MECHANICAL ACCESS

A. Manufacturers

1. Acudor Products Inc: www.acudor.com.

a. Units in Walls, Unless Otherwise Indicated: ACUDOR ADWT.

b. Units in Fire-Rated Walls Rated 2 Hours and Less: ACUDOR FB-5015.

2. Babcock-Davis: www.BabcockDavis.com.

3. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 CEILING UNITS FOR ATTIC ACCESS

A. Manufacturers:

1. Battic Door Energy Conservation Products Box 15, Mansfield, MA 02048; www.batticdoor.com

a. Model No. 22x30

2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Access Doors: Kit includes a wood frame, preinstalled trim, and an insulating door.

1. Material: Insulated Wood.

2. Style: As indicated.

3. Insulation: 10" thick Extruded Polystyrene (EPS): R-42.

4. Finish: Pre-finished in factory: satin white.

5. Size(s): 22 in. x 30 in..

6. Trim: Tapered wood trim 2" wide is pre-secured to frame and painted satin white to match door.

7. Gasketing: Tripple rubber gasketed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Coordinate access door installation with supporting construction installation.

C. Install at locations shown on drawings or, if not indicated, as determined in the field by the Architect.

D. Install frames plumb and level in openings. Secure rigidly in place.

E. Position units to provide convenient access to concealed equipment when necessary.

3.03 SCHEDULE

A. Provide interior wall units

1. (1) 16" x 16" panels as directed.

2. (1) 24" x 24" panels as directed.

B. Provide interior wall units in wet areas:

1. (2) 16" x 16" panels as directed.

C. Provide interior fire rated wall units:

1. (1) 16" x 16" panel as directed.

D. Provide ceiling unit for attic access:

1. (1) 20" x 30" panel as indicated on the drawings.

E. Provide ceiling units for mechanical access:

1. (2) 24" x 24" panels as directed.

F. Provide fire rated ceiling units for mechanical access:

1. (1) 16" x 16" panel as directed.

G. Provide exterior wall units:

1. As indicated on drawings.

END OF SECTION

SECTION 083313
COILING COUNTER DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated coiling counter doors and operating hardware.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Rough openings.

B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

C. Section 092116 - Gypsum Board Assemblies: Rough openings.

1.03 REFERENCE STANDARDS

A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's standard literature showing materials and details of construction and finish.

C. Shop Drawings: Indicate rough and actual opening dimensions, anchorage methods, hardware locations, and installation details.

D. Manufacturer's Instructions: Indicate installation sequence and installation, adjustment, and alignment procedures.

E. Operation and Maintenance Data: Indicate modes of operation, lubrication requirements and frequency, and periodic adjustments required.

PART 2 PRODUCTS

2.01 COILING COUNTER DOORS

A. Coiling Counter Doors, Non-Fire-Rated: Stainless steel slat curtain.

1. Mounting: Between jambs, within prepared opening.

2. Nominal Slat Size: 1-1/4 inches wide.

3. Slat Profile: Flat.

4. Finish, Stainless Steel: No. 4 - Brushed.

5. Guides: Formed track; same material and finish unless otherwise indicated; fitted with removable curtain stops.

6. Hood: Manufacturer's standard, finished to match curtain.

7. Manual push up operation.

8. Locking Devices: Slide bolt on inside.

2.02 MATERIALS

A. Curtain Construction: Interlocking, single thickness slats.

1. Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.

2. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.

3. Stainless Steel Slats: ASTM A666, Type 304; minimum thickness 22 gage, 0.03 inch.

B. Guide Construction: Continuous, of profile to retain door in place, with mounting brackets of same metal.

1. Stainless Steel Guides: ASTM A666, Type 304, rollable temper.

C. Hood Enclosure: Internally reinforced to maintain rigidity and shape. Stainless Steel #4 Finish, 24 Gauge.

D. Lock Hardware:

E. Latching Mechanism: Inside mounted, adjustable keeper, spring activated latch bar feature to keep in locked or retracted position.

F. Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.

G. Roller Shaft Counterbalance: Steel pipe and torsion steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

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END OF SECTION

SECTION 083613
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Operating hardware and supports.

B. Electrical controls.

C. See Part 2 "Performance Criteria" for specific work performance criteria required for this contractand other Prime Contracts as part of the Work of this section.

1.02 RELATED REQUIREMENTS

A. Section 055000 - Metal Fabrications: Steel plate opening frame.

B. Section 088000 - Glazing: Glazing for door lights.

C. Section 260501 - Basic Electrical Materials and Methods: Conduit and wiring from door operators to door motors.

D. Section 260583 - Wiring Connections.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors 2011.

D. ITS (DIR) - Directory of Listed Products current edition.

E. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2000, with Errata (2008).

F. NEMA MG 1 - Motors and Generators 2018.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2018.

H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL (DIR) - Online Certifications Directory Current Edition.

J. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.

K. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, installation details, and confirmation of project minimum 45 psf wind-load rating.

C. Product Data: Show component construction, anchorage method, and hardware.

D. Selection Samples: Submit two complete sets of color chips representing manufacturer's full range of available colors for Kynar finish and two samples of RAL 3003..

E. Qualification Statements:

1. Manufacturer 's certificate that products meet or exceed specified requirements.

2. Installer's qualifications.

F. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.

G. Operation Data: Include normal operation, troubleshooting, and adjusting.

H. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

I. Delegated Design Data: As required to show compliance with performance and design requirements.

J. Provide complete wiring schematics for Electrical Contractor tie-ins to necessary building systems

K. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section approved by manufacturer, and an authorized distributor of the manufacturer in order to ensure accessibility to parts, updated product changes, recalls, and warranty claims.

C. Comply with applicable code for motor and motor control requirements.

D. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Pursuant to manufacturer's published instructions.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Protect against moisture exposure and damage.

1.07 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

B. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for warranty requirements.

B. Warranty: Include coverage for electric motor and transmission.

1. Component parts to be free from defects in material and workmanship for a period of one (1) year from installation date.

2. Door shall be free from delamination for ten (10) years from installation date.

3. Insulation shall maintain its R-Value for twenty (20) years from installation date.

PART 2 PRODUCTS

2.01 PERFORMANCE CRITERIA

A. Provide labor and materials necessary to provide a complete system.

B. Perform all work of this section with experienced workmen familiar with the work, and in accordance with industry standards and manufacturer's recommendations.

C. Provide wiring and controls between individual door control stations and door electric operators.

D. Electrical Contractor is responsible for the following:

1. Electrical wiring, controls, and connections from door to Radio Room or other remote location to each door operator.

2. Electrical wiring, controls, and connections to other building systems.

E. General Performance: Sectional doors shall meet performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

2.02 MANUFACTURERS

A. Basis of Design: Raynor of Dixon, Illinois; Product TC Series, "TC300": www.raynor.com

B. Substitutions: See Section 016000 - Product Requirements.

2.03 DOOR COMPONENTS

A. Steel Doors: Flush steel, insulated; high lift operating style, as shown on drawings, with track and hardware; complying with DASMA 102, Commercial application.

1. Structural Performance Requirements: Withstand effects of gravity loads, and withstand positive and negative wind loads as calculated in accordance with New York Building code without damage or permanent set, when tested in accordance with ASTM E330, using 10 second duration of maximum load.

a. Deflection Limits: Withstand design wind loads without evidencing permanent deformation or disengagement of door components. Deflection of door in horizontal position (open) shall not exceed 1/120 of the door width.

b. Required Wind Loading: Provide doors capable to withstand a **minimum 45 psf** wind-load rating. Wind Loading Value will be required to be labelled on submitted Shop Drawings.

c. Provide U-bars on all doors 14'-0" or wider.

2. Air Infiltration (ASTM E283): Maximum rate per foot of door perimeter (floor, jamb, and header) of 0.81 CFM at 25 mph. No air leakage shall be detected between section joints.when tested in accordance with ASTM E283.

3. Thermal Conductivity: Minimum R-Value of 5.26 (U Value of .19), calculated in accordance with ASTM C518 and DASMA Technical Data Sheet #163. Insulation must not be manufactured with nor contain chlorofluorocarbons (CFC) which are known to have harmful effects on the earth' s ozone layer and the environment.

4. Door Nominal Thickness: 2 inches thick.

5. Thermal Transmittance: U-factor of 0.20 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.

6. Exterior Finish:

a. 4 (Four) doors:Pre-finished with epoxy primer and Kynar finish of color as selected from manufacturer's full range.

7. Interior Finish: Pre-finished prior to roll forming with epoxy primer and Kynar finish of Frost White color.

8. Glazed Lights: Provide glazed lights as indicated in the construction documents. The project may contain glazed lights of each type.

   a. Standard Full View (square-edge) lights of maximum allowable width and all of equal width; set in place encased in an extruded PVC frame with thermal break and 5/8" insulated Low-E glass, sized according to door widths; **CUSTOM** configurations as shown on drawings regardless if conditions represent a custom application.

   b. Full View Aluminum (square-edge) lights of maximum allowable width and all of equal width; set in place in extruded aluminum stile and rail framing and 5/8" insulated Low-E glass, sized according to door widths; **CUSTOM** configurations as shown on drawings regardless if conditions represent a custom application.

9. Electric Operation: Electric control station.

B. Door Panels: Doors consisting of sections to be 2" thick roll formed from commercial quality hot dipped galvanized steel per ASTM A924 and A653. Door sections constructed of 26 gauge (ext.) and 26 gauge (int.) (exclusive of finish), stucco embossed interior and exterior skins.

1. Interior and exterior skins to be mechanically interlocked and pressure bonded to a 1-7/8" thick extruded polystyrene core.

2. Interior and exterior skins to be separated by a continuous dual durometer vinyl extrusion to form an effective thermal break and a complete weather-tight seal along section joint.

3. Thermal break extrusion to be held in place by means of mechanical interlock.

4. End stiles to be minimum 18 gauge separated from exterior skin with vinyl thermal break.

2.04 COMPONENTS

A. Track: Rolled galvanized steel, 0.109 inch thick; 3 inch wide, continuous one piece per side, fully adjustable for adequate sealing of door to jamb or weatherseal; floor-to-header angle mount galvanized steel mounting brackets not less than 1/8 inch thick and minimum 3-1/2 x 5 inch size.

1. Configuration Type: As indicated on drawings.

2. Tracks to be continuous angle mounted and fully adjustable for sealing door to jamb. Continuous angle mount to be not less than 11 gauge steel angle, 2-5/16" x 4" for 3-inch track. Horizontal track to be adequately reinforced with continuous angle.

3. Doors over 12 ft. high must be center hung by using 2 x 2 galvanized hanger angle.

4. Ensure that transitions between adjacent sections of track are smooth and without gaps.

5. Provide graduated seal for weathertight closing.

6. Provide center hanger on tracks for door over 12'-0" high: 2" x 2" galvanized hanger angles.

7. Provide continuous angle reinforcement for horizontal tracks.

8. Provide manufacturer's standard stop at the end of the track.

9. Ensure that transitions between adjacent sections of track are smooth and without gaps.

B. Hinges, Brackets, and Roller Assemblies: Full heavy duty hinges, brackets, and adjustable roller holders of galvanized steel; 3" diameter heavy duty, floating hardened steel bearing rollers with minimum ten (10) ball bearings, located at top and bottom of each panel, each side.

C. Lift Mechanism: Heavy-duty, oil-tempered wire torsion springs on a continuous ball-bearing cross head shaft, with heavy-duty oil-tempered braided galvanized, aircraft type steel lifting cables with a minimum safety factor of 5.

1. Spring Requirements: 50,000 cycles.

D. Emergency Manual Operation

1. Emergency Operation Disconnect Device - Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

E. Sill Weatherstripping: Resilient flexible U-shaped vinyl, one piece, encased in extruded aluminum retainer to conform to floor irregularities; fitted to bottom of door panel, full length contact.

1. A bottom seal screwed to the bottom door panel is not allowed.

F. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with EPDM rubber blade type weatherstripping, attached to track angle mounting with rigid vinyl snap-on extrusion.

G. Head Weatherstripping: EPDM rubber seal, one piece full length.

H. Panel Joint Weatherstripping: Dual durometer vinyl extrusion, one piece full length to form an effective thermal break and a complete weather-tight seal along section joint.

I. Weatherstripping shall be replaceable without removal of track, angle mounting, or door hardware.

2.05 MATERIALS

A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface; 26 gauge exterior and 26 gauge interior.

B. Insulation: Extruded Polystyrene, manufactured with a non-CFC blowing agent, bonded to facing.

1. R-value of 5.26 (U Value of .19).

2. 1-7/8" thick.

2.06 ELECTRIC OPERATION

A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.

1. Provide interlock switches on motor operated units.

B. Electric Operators:

1. Mounting: Side mounted on cross head shaft.

2. Motor Enclosure:

3. Continuous Duty Industrial - 1/2 hp, ; manually operable in case of power failure, belt-drive, jackshaft with transit speed of 6 to 12 inches per second.

4. 115/230V, single phase, 60 Hz.

5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.

6. Controller Enclosure: NEMA 250, Type 1.

7. Opening Speed: 12 inches per second.

8. Brake: Adjustable friction clutch type, activated by motor controller.

9. Manual override in case of power failure.

10. Refer to Section 260583 for electrical connections.

11. Duty Cycle: 30 cycles/hour.

C. Motor: NEMA MG1, Type 1; separate from reduction mechanism for ease of maintenance.

D. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

E. Roller Chain Drive - door shall be driven by roller chain at 6" to 12" per second.

F. Reduction Mechanism: V-belt drive from motor to full ball bearing power train with additional reduction by chain and sprockets. All power train shafts shall be minimum 3/4" diameter.

G. Adjustable Friction Clutch shall be provided to protect door and operator if door movement is obstructed.

H. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.

1. 24 volt circuit.

2. Surface mounted, at interior door jamb.

3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.

a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.

I. Electric Operator: Jackshaft or jackshaft trolley as indicated on the drawings; adjustable safety friction clutch; electro-mechanical type brake system actuated by solenoid motor starter; enclosed, positive chain drive screw type limit switch, enclosed in electrical control box, easily accessible for precision setting; heavy duty, enclosed magnetic cross line reversing starter with mechanical interlock; auxilliary contact type SR2 wiring; mounting brackets and hardware; with hoist.

1. Product: 1/2 hp "ControlHoist 2.0 Standard, model number CSH - 223" as manufactured by Raynor.

2. Substitutions - Not Permitted.

J. Obstruction Detection Devices:

1. Equip motorized door with indicated external automatic safety sensors capable of protecting full width of door opening. Activation of either device immediately stops and reverses downward door travel.

2. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

a. Self-Monitoring Type: Four-wire configured device designed to interface with door-operator control circuit to detect damage to or disconnection of safety edge.

b. Locate within astragal or weather stripping mounted to bottom bar. Contact with sensor activates the device. Connect to control circuit using manufacturer's standard taker-up reel or self-coiling cable.

3. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

    a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensor device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.

    b. Provide one sensor at standard height and one at the bumper height of the truck using the door.

    c. Activation of device immediately stops and reverses downward door travel.

K. Control Station: Three button (open-close-stop) SR5 momentary contact type control for each electric operator.

1. 24 volt circuit

2. Recess mounted.

    a. Basis-of-Design: CUSTOM Configuration for Operator Pushbuttons - Flush Mounted as detailed on the Drawings.

3. Locate at inside door jamb or as indicated on the Drawings.

4. Open override feature. Open button, and pneumatic safety edge will reverse door to open position when door is closing.

5. Configure and provide wiring to open door closest to Radio Room one foot when emergency carbon monoxide gas exhaust fan system is activated. Emergency exhaust fan system is independent of vehicle exhaust fan system. Coordinate this action with Mechanical and Electrical Contractors.

6. Provide an additional override to allow the door to be closed completely at end of carbon monoxide exhaust operation.

7. **Configure and provide wiring to start vehicle exhaust fan system when door is being opened and then shut the fan(s) off when the doors are fully closed with an override control.**

8. Provide recessed mounted control stations at 1 location(s) in Radio Room walls per Architect's direction. Control stations shall operate all doors with open-close-stop from Radio Room. Provide individual switches with pilot lights for each door. Pilot lights to show door closed and door open. Provide Long Wiring Kit to ensure proper voltage for multiple push button stations. Provide a brushed stainless steel bezel with finished edges for installation of the switches. See Drawings for all remaining information.

    a. Product: Raynor Model PBS-3, 3-button push button switch assembly, No Substitutions.

L. Overload Protection: Provide manual reset for overload protection. All electrical components shall be in NEMA 1 enclosures.

M. Stop-Go Light: Red and green, stop-go lights at each door that indicate fully open-fully closed installed as **recessed** application Model RGL24LY (Safety Yellow Housing) as manufactured by *Lift Master*, No Substitutions.

N. Receivers And Transmitters

1. Recievers: Provide a receiver to operate each overhead door.

2. Hand Held Transmitter: Digital control, resettable; four channel, four button; eight (8) required

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits. In the Record Documents, list unsatisfactory conditions and steps taken to correct them.

B. Verify that electric power is available and of the correct characteristics.

C. Correct unsatisfactory conditions before installing doors. Beginning installation shall constitute acceptance of related work and corrected existing conditions by Installer and Contractor.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit to steel jamb plates.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions and NFPA 80.

B. Tracks:

1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.

2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door operating equipment.

3. Repair galvanized coating on tracks according to ASTM A780.

C. Anchor assembly to wall construction and building framing without distortion or stress.

D. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

E. Fit and align door assembly including hardware.

F. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

G. Complete door control, operating device, and unit component connections to other building systems.

H. Select, identify, and locate controls so safety of users and protection of property and vehicles is ensured.

I. Provide inserts, anchors, hangers, brackets, moldings, seal strips, and welding as needed to make door assembly secure against air pressure, operating loads and intrusion, and so that air infiltration is held to minimum.

J. Conceal bolt heads so that access cannot be made from outside.

K. Immediately after welding galvanized materials, clean welds and abraded galavanized surfaces. Repair galvanizing to comply with ASTM A780.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/16 inch.

B. Maximum Variation from Level: 1/16 inch.

C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

D. Maintain dimensional tolerances and alignment with adjacent work.

3.05 SYSTEM STARTUP

A. Engage a factory-authorized service representative to perform system startup after door assemblies are complete and connected to other building systems.

1. Complete installation and startup checks according to manufacturer's written instructions.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Follow manufacturer's written instructions.

3.06 ADJUSTING

A. Adjust door assembly for smooth operation and full contact with weatherstripping, maintaining airtightness and watertightness around the entire perimeter, under all conditions of normal and emergency use. Contractor will perform this task as needed until Final Completion of the project.

B. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

C. Lubricate bearings and sliding parts as recommended by manufacturer.

D. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

3.07 CLEANING

A. Comply with manufacturer's written recommendations for final cleaning and maintenance.

B. Clean doors and frames and glazing immediately after installation. Avoid damaging protective coatings and finishes.

C. Remove excess sealants, glazing materials, dirt, and other substances.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.08 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Replace door panels and accessories that may have been damaged during construction period.

C. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

3.09 DEMONSTRATION

A. Engage a factory-authorized service representative to train owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION

SECTION 084113
ALUMINUM AND FRP DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Exterior aluminum and FRP doors and framing.

1.02 RELATED DOCUMENTS

A. Section 079005 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 087100 - Door Hardware: Hardware items other than specified in this section.

C. Section 088000 - Glazing: Glass and glazing accessories.

1.03 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.04 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.

2. Dimensional tolerances of building frame and other adjacent construction.

3. Failure includes the following:

a. Deflection exceeding specified limits.

b. Thermal stresses transferring to building structure.

c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.

d. Noise or vibration created by wind and by thermal and structural movements.

e. Loosening or weakening of fasteners, attachments, and other components.

f. Sealant failure.

g. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Loads:

1. Wind Loads:

a. Basic Wind Speed: 120 mph.

b. Importance Factor: 1.1.15

c. Exposure Category: C.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.

F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).

G. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

H. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain

and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2. Interior Ambient-Air Temperature: 75 deg F (24 deg C).

I. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.57 Btu/sq. ft. x h x deg F (3.23 W/sq. m x K) when tested according to AAMA 1503.

J. Surface Burning Characteristics with Class C rating at exterior face of exterior FRP Doors, ASTM E 84:

1. Flame Spread (Class C): Maximum of 170.

2. Smoke Developed (Class C): Maximum of 390.

K. Surface Burning Characteristics with Class A rating at interior face of exterior FRP Doors, ASTM 84 E:

1. Flame Spread (Class A): Maximum of 15.

2. Smoke Developed (Class A): Maximum of 310.

L. Impact Strength of FRP Door: ASTM D 256, Nominal Value, 15.0 foot-pounds per inch of notch.

M. Water Absorption of FRP Door: ASTM D 570, Nominal Value, 0.20% after 24 hours.

N. Indentation Hardness of FRP Door: ASTM D 2583, Nominal Value, 55.

O. Abrasion Resistance of FRP Door Face Sheet: Maximum of .029 average weight loss percentage after Taber Abrasion Test after 25 cycles at 1000 gram weight with CS-17 Wheel.

P. Stain Resistance of FRP Door Face Sheet: ASTM D 1308, Face Sheet unaffected after exposure to red cabbage, tea and tomato acid. Stain removed easily with mild abrasive of FRP cleaner when exposed to permanent ink pen marker and white spray paint.

Q. Chemical Resistance of FRP Door: ASTM D 543. Excellent rating.

1. Acetic Acid, 5% solution.

2. Chlorine Bleach, 10% solution.

3. Sodium Hypochlorite, 4 to 6% solution.

4. Citric Acid, 10% solution.

5. Sodium Carbonate, 20% solution.

6. Turpentine.

R. Tensile Strength of FRP Doors, Nominal Value: ASTM D 638: 14,000 psi.

S. Flexural Strength of FRP Doors, Nominal Value: ASTM D 790: 21,000 psi.

T. Hurricane Test Standards, Single Door with Single Point Latching:

1. Uniform Static Load, ASTM E 330: Plus or minus 75 psf.

2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b) (5): Passed.

3. Cyclic Load Test, SFBC PA 203: Plus or minus 53 psf.

4. Large Missile Impact Test, SFBC PA 201: Passed.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. VOC Submittal:

1. Product Data: For adhesives and sealants used inside of the weatherproofing system, including printed statement of VOC content.

C. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

2. Show details where door framing and glazing framing intersect and clearly note the different materials.

3. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

D. Wiring Diagrams:

1. Provide riser diagrams for electrified hardware and coordinate with electrical.

2. Show conduit in shop drawings and reference in door and frame schedule.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Qualification Data: For qualified Installer.

G. Welding certificates.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

I. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

J. Warranties: Sample of special warranties.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

C. Accessible Entrances: Comply with applicable provisions in ICC/ANSI A117.1.

D. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

E. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.

b. Noise or vibration caused by thermal movements.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

d. Water leakage through fixed glazing and framing areas.

e. Failure of operating components.

2. Warranty Period: Ten years from date of Substantial Completion.

3. Hardware attachment warranty: Door Manufacturer to factory apply all hardware with the exception of closers using only machine fasteners and warrant attachment for a period of ten years.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide the following:

1. Special-Lite, Inc. (Basis-of-Design)

2. Kawneer Corporation

3. United States Aluminum

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 (ASTM B 209M).

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).

3. Extruded Structural Pipe and Tubes: ASTM B 429.

4. Structural Profiles: ASTM B 308/B 308M.

5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.

2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.

3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.03 FRAMING SYSTEMS

A. Exterior Frames:

1. Glazing Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

a. Construction: Thermally broken or thermally improved at glazing

b. Glazing System: Retained mechanically with gaskets on four sides .

c. Glazing Plane: Center .

2. Door Framing Members: The immediate door frame shall be non-thermally broken and separate material from thermal storefront framing and will be heavy wall (1/8”) material. Standard storefront framing will not suffice for door jambs and headers. The intermediate door frame and Aluminum doors will come from the same manufacturer. Reinforce frame at all hardware fastening points to prevent pull out of fasteners under extreme cycling conditions.

3. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

4. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

a. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

b. Reinforce members as required to receive fastener threads.

5. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

6. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.

7. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

    a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

8. Product:

    a. Basis of Design; Special-Lite SL-450TB.

    b. Substitutions: See Section 016000 - Product Requirements.

B. Interior frames:

1. Glazing Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

    a. Construction: Nonthermal frame.

    b. Glazing System: Retained mechanically with gaskets on four sides .

    c. Glazing Plane: Center .

2. Door Framing Members: The immediate door frame shall be non-thermally broken and will be heavy wall (1/8") material. Standard storefront framing will not suffice for door jambs and headers. The intermediate door frame and Aluminum doors will come from the same manufacturer. Reinforce frame at all hardware fastening points to prevent pull out of fasteners under extreme cycling conditions.

3. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

4. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

    a. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

    b. Reinforce members as required to receive fastener threads.

5. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

6. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.

7. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

a. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

8. Product:

a. Basis of Design; Special-Lite SL-245.

b. Substitutions: See Section 016000 - Product Requirements.

2.04 GLAZING SYSTEMS

A. Glazing: As specified in Division 08 Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.05 FIBER REINFORCED PLASTIC (FRP) DOORS – SANDSTONE:

A. Construction:

1. Door Thickness: 1-3/4 inches.

2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.

3. Corners: Mitered.

4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.

5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.

6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.

7. Rail caps or other face sheet capture methods are not acceptable.

8. Extrude top and bottom rail legs for interlocking continuous weather bar.

9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.

10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.

11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable

B. Face Sheet:

1. Material: Exterior grade UV resistant FRP, 0.120-inch thickness, finish color throughout.

2. Texture: Sandstone.

3. Color: As selected by Architect from manufacturer's full range.

C. Core:

1. Material: Poured-in-place polyurethane foam.

2. Density: Minimum of 5 pounds per cubic foot.

3. R-Value: Minimum of 9.

D. Cutouts:

1. Manufacture doors with cutouts for required vision lites, louvers, and panels.

2. Factory install vision lites, louvers, and panels.

E. Hardware:

1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

2. Factory install hardware.

F. Product:

1. Basis of Design; Basis of Design; Special-Lite SL-20

2. Substitutions: See Section 016000 - Product Requirements.

2.06 GLAZING

A. Refer to Section 088000 “Glazing” for glazing requirements.

B. Allow for thermal expansion on exterior units.

C. Glass as indicated and factory glazed into doors.

2.07 HARDWARE

A. Hardware as indicated in Specification Sections and Drawings. Hardware at doors and aluminum framing are to be installed by door manufacturer.

1. Door Design: Wide stile; 5-inch (127-mm) nominal width.

a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.

2. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide nonremovable glazing stops on outside of door.

B. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware." or as indicated below.

1. Provide SL-301 concealed adjustable bottom brush for aluminum doors for manual adjustment. Automatic door bottoms are not acceptable.

2. For pairs of doors provide door manufacturer’s recessed dual brush adjustable astragal on active door leaf for full-height seasonal adjustment.

3. Provide SL-88 Factory installed recessed flush pull by Door Manufacturer

2.08 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

1. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

2.09 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.

3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.

4. Physical and thermal isolation of glazing from framing members.

5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

6. Provisions for field replacement of glazing from interior.

7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

C. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

D. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

E. Entrance Door Frames: Reinforce as required to support loads imposed by extreme cycling of door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.

2. At exterior doors, provide concealed adjustable dual brush weather sweeps applied to door bottoms.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible using machine fasteners.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.7 mils or thicker. Color to be selected from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.

6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

D. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

F. Install glazing as specified in Division 08 Section "Glazing."

1. Structural-Sealant Glazing:

a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

b. Install weatherseal sealant according to Division 07 Section "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

3.03 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.

2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).

b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

3.04 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

END OF SECTION 084113

SECTION 084313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.02 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware: Hardware items other than specified in this section.

B. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details .

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

E. Samples: Submit two sample(s) 2 x 2 inches in size illustrating finished aluminum surface. Provide samples of each of the manufacturer's full line of colors for Architect selection.

F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years ofdocumented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Front-Set Style, Structural Sealant Glazed Verticals, Thermally-Broken:

1. Vertical Mullion Dimensions: 2 inches wide by 4 1/2 inches deep.

B. Manufacturers: Provide one of the manufacturers listed below:

1. YKK AP America Inc; YES 45 TU: www.ykkap.com.

2. Kawneer North America[<>]: www.kawneer.com.

C. Substitutions: See Section 016000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING

A. Center-Set Style:

1. Vertical Mullion Dimensions: 1-3/4 inches wide by 4-1/2 inches deep.

B. Manufacturers: Provide one of the manufacturers listed below:

1. YKK AP America Inc: YES 45 FS, www.ykkap.com.

2. Kawneer North America[<>]: www.kawneer.com.

C. Substitutions: See Section 016000 - Product Requirements.

2.03 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Monolithic Glazing:

B. Wide Stile, Insulating Glazing, Thermally-Broken:

C. Manufacturers: Provide one of the manufacturers listed below:

1. Monolithic Glazing: YKK AP America Inc; 50D: www.ykkap.com.

2. Insulating Glazing: YKK AP America Inc; MegaTherm 50XT: www.ykkap.com.

3. Kawneer North America[<>]: www.kawneer.com.

D. Substitutions: See Section 016000 - Product Requirements.

2.04 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Glazing Rabbet: For 1 inch insulating glazing.

2. Finish Color: As selected by Architect from manufacturer's full line..

3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.

4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.

8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.

B. Performance Requirements:

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.

a. Design Wind Loads: Comply with requirements of ASCE 7.

b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 12 psf.

3. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.

4. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.

5. Overall U-value Including Glazing: 49 Btu/(hr sq ft deg F), maximum.

2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Framing members for interior applications need not be thermally broken.

2. Glazing Stops: Flush.

B. Glazing: As specified in Section 088000.

1. For Exterior Storefront: Type ISG.

2. For Interior Storefront: Type SG.

3. For Exterior Glass Spandrel Panels: Type IG.

4. For Interior Glass Spandrel Panels: Type SG

C. Swing Doors: Glazed aluminum.

1. Finish: Same as storefront.

2.06 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Concealed Flashings: 0.018 inch thick galvanized steel.

D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

E. Glazing Accessories: As specified in Section 088000.

2.07 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.

2.08 HARDWARE

A. For each door, include weatherstripping, sill sweep strip, and threshold.

B. Other Door Hardware: As specified in Section 087100.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Provide perimeter anchors of sufficient size, adequate material, and proper spacing to transmit all loads into building structure. Isolate carbon steel anchors from aluminum.

E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

F. Apply insulating coating at a rate of at least 1.6 to 2.1 mils, dry film thickness, where aluminum contacts other metals or concrete, plaster, or other alkaline materials.

1. In contact with other metals: apply zinc primer coating to other metal.

2. In contact with concrete, plaster, other alkaline materials: apply bituminous coating to aluminum.

G. Provide thermal isolation where components penetrate or disrupt building insulation.

H. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

I. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

J. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

K. Set thresholds in bed of sealant and secure.

L. Install glass and infill panels in accordance with Section 088000, using glazing method required to achieve performance criteria.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.

B. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING

A. Adjust operating hardware for smooth operation.

3.06 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.07 PROTECTION

A. Protect installed products from damage during subsequent construction and from any contaminants, including, but not limited to, concrete, mortar, plaster, lime, acid, paint, and waterproofing materials.

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SECTION 085123
STEEL WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory finished steel windows with fixed and operating sash.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

D. SWI (INTRO) - Architect's Guide to Steel Windows and Doors Current Edition.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, fasteners, anchors, and glass.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; installation requirements.

D. Samples: Submit two, 6 by 6 inch in size, illustrating window frame section and glazing materials.

E. Submit two sampls of each of the manufacturer's full line of colors for Architect selection.

F. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements.

G. Installer's Qualification Statement.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and after installation of sealants.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

1. Include coverage for degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Windows:

1. Fyre-Tec; Series 900 - Horizontal Slider: www.fyre-tec.com/#sle.

2. Substitutions: See Section 016000 - Product Requirements.

2.02 STEEL WINDOWS

A. Steel Windows: Hot rolled steel sections, factory fabricated, factory finished, with vision glass, infill panels, related flashings, anchorage and attachment devices.

1. Sash Configuration: Provide horizontal sliding sash layout.

2.03 COMPONENTS

A. A.Steel Frames and Inserts

1. Steel frames and inserts shall be fabricated from roll-formed galvanized lock-forming quality steel per ASTM A 653.

2. Frame and insert corners shall mitered and welded. Integral muntins where required shall be galvanized roll-formed material fitted and welded.

3. Operable insert/sash shall be supported on two field adjustable roller trucks consisting of corrosion resisting steel with integral ball bearing rollers. Rollers are to supported and operate on a stainless steel track.

4. Installation Kits

    a. Provide attachable fin installation kits for all windows.

    b. Provide subframe installation kits for all windows.

5. Formed Component Parts

    a. Formed component parts shall be hot-rolled sheet steel conforming to ASTM A 569, commercial quality with a minimum of 0.15 percent carbon.

    b. Sheet steel shall be zinc coated (galvanized) by the hot-dip process in accordance with ASTM A 653 or ASTM A 924.

6. Screws and Bolts

    a. Screws and bolts shall conform to ASTM B 766, ASME B18.6.3 and ASME B18.6.4.

7. Fasteners

    a. Fastening devices shall be window manufacturer's design made from non-magnetic stainless steel, cadmium-plated steel, zinc-plated steel, nickel/chrome-plated steel or magnetic stainless steel.

8. Window Anchors

    a. Anchors for installing windows shall be stainless steel or hot-dip zinc coated steel conforming to ASTM A 123.

9. Glass and Glazing

    a. As specified in Section 088000.

    b. Standard clear ceramic glass

2.04 FABRICATION

A. Fabricate windows in accordance with approved shop drawings.

B. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

C. Accurately fit and secure joints and corners. Make joints flush and hairline.

D. Arrange fasteners to conceal from view.

E. Factory-glaze window units.

2.05 FINISHES

A. Window Frames: Baked enamel finish.

1. Factory-finished before forming.

B. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with treated wood, cementitious, or dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify wall openings and adjoining materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install window frames and glass and glazing in accordance with manufacturers instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Install operating hardware.

F. Install glass and infill panels in accordance with Section 088000, to glazing method required to achieve performance criteria.

3.03 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.04 CLEANING

A. Remove protective material from factory finished surfaces.

B. Remove labels and visible markings.

C. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

3.05 PROTECTION

A. Do not permit continuing construction activities near unprotected finish surfaces.

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SECTION 085200
WOOD WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Factory fabricated aluminum clad wood windows.

B. Operating hardware.

C. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Rough opening framing.

B. Section 072119 - Foamed-In-Place Insulation : Perimeter insulation.

C. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

D. Section 088000 - Glazing: Glass units for factory glazing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights 2017.

B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2012.

C. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.

D. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 PERFORMANCE REQUIREMENTS

A. Design and performance requirements:

1. Double-hung tilt windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 and ANSI/AAMA/NWWDA 101/I.S.2/A440-08:

    a. H-LC50 / LC-PG50-H (47-1/2" x83-1/2" frame size tested)

2. Vertical/horizontal mull, mulled and applied rating: LC50.

3. Air infiltration shall not exceed 0.30 cfm/ft2 (1.5 L/s•m2) when tested at 1.57 psf [75 Pa] according to ASTM E283.

4. No water penetration when tested at the following pressure according to ASTM E547:

   a. H-LC50 / LC-PG50-H - 7.50 psf (360 Pa)

5. Double-hung tilt windows must withstand the following positive/negative structural test pressure without damage when tested according to ASTM E330/E330M :

   a. H-LC50 / LC-PG50-H - +75.0/-75.0 psf (+3600/-3600 Pa)

6. Double-hung tilt windows must pass a forced entry resistance test of at least Grade 10 to meet requirements set forth in ASTM F588.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Show component dimensions, anchorage and fasteners, glass, and internal drainage details.

C. Performance Validation: Provide specified performance validation before submitting shop drawings or starting fabrication.

D. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

E. Samples:submit samples including the following:

1. Exterior: submit two sets of color samples of exterior color finishes from manufacturers full line of standard colors.

2. Submit two samples of each type of typical operating hardware finish materials.

F. Manufacturer's Certificate: Certify that products furnished meet or exceed specified requirements.

G. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

H. Manufacturer's Qualification Statement.

I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Installer: Company specializing in performing the work of this section approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with the requirements for storage and handling of products as specified in Section 016000 - Product Requirements.

B. Handle products of this section in accordance with AAMA CW-10.

C. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

D. Store units in a dry location, off the ground, under cover, protected from weather and construction activities.

1.09 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and after installation of sealants.

1.10 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a twenty year period after Date of Substantial Completion.

C. Provide twenty year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

D. Warranty: Include coverage for the following:

1. Degradation of color finish.

2. Delamination or separation of finish cladding from window member.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum Clad Wood Windows:

1. Basis of Design: Weather Shield Manufacturing, Inc; Premium Series Windows: www.weathershield.com/#sle.

2. Other acceptable manufacturers:

   a. Andersen Windows, Inc; E Series Windows: www.andersenwindows.com/#sle.

   b. Pella Corporation; Architect Series Reserve: www.pellacommercial.com/#sle.

3. Substitutions: See Section 016000 - Product Requirements.

2.02 WOOD WINDOWS

A. Window Types:

1. 8211 Casement Windows

2. 8211 Awning Windows

3. 8306 Special Shape Windows

B. All windows are sized for masonry openings, so **custom sized windows may be required**. See the contract drawings for window sizes.

C. Wood Windows: Wood frame and sash, factory fabricated and assembled.

1. Exterior Finish: Fluoropolymer-modified acrylic topcoat over fluoropolymer primer meets AAMA 2605 requirements. Color: to be selected by Architect from manufacturer's standard colors..

2. Interior Finish: Factiory stained and sealed in color to be selected by Architect from manufacturer' s standard colors..

3. Color: As selected by Architect from manufacturer's standard range.

4. Configuration: As indicated on drawings.

5. Wood Species: Clear pine, kiln dried to a moisture content of 6-12% at the time of fabrication and preservative treated using treatment type suitable for required finish.

6. Frame and Sash Members: Rabbetted at head and dadoed at sill joints. Glue and steel pin joints to hairline fit, weather tight.

7. Metal Cladding: Extruded aluminum, factory finished, factory fit to profile of wood members.

8. Frame with Integral nailing fin removed in factory for Masonry openings – 5-1/2" installation straps to be supplied and used. Top corners shall be mitered, include internal aluminum corner keys, chemically and mechanically fastened.

9. Transparent Finish: Scarf joints permitted if wood matches in color and grain texture.

10. Clearances and Shim Spacing: Minimum required for installation and dynamic movement of perimeter seal.

11. Fasteners: Concealed from view.

12. Insect Screen: Locate on inside of windows.

13. Operable Units: Double weatherstripped.

D. Performance Requirements:

1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements in accordance with the following:

a. Performance Class (PC): R.

2. Performance Validation: Windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.

3. Overall U-value, Including Glazing: 0.35 , maximum, measured on the window size required for this project.

4. Forced Entry Resistance: Tested to comply with ASTM F588 requirements for performance level 20 for specific window style required.

2.03 COMPONENTS

A. Glazing: As specified in Section 088000, with glass thicknesses as recommended by manufacturer for specified wind conditions.

1. Glazing method: Insulated glass consisting of two lites: one lite high-performance multi-layered sputter coat Low E 272 applied to the number two surface and one lite of clear glass with gray warm-edge spacer system and argon/inert gas in airspace with Cardinal “Neat” (or architect approved equivalent) coating applied to the exterior face. Tempered glass where required by code.

2. Glass shall be siliconed at sash exterior to allow reglazing from the interior.

B. Frames: 1-1/4” 32mm head, 9/16” 15mm side jambs and 1” 26mm sill inch wide by 5-13/16” inch deep profile; flush solid wood glass stops of screw fastened type, sloped for positive drainage.

C. Sash:

1. Sash shall be composed of two materials, an extruded aluminum exterior, butt joined at corners, chemically and mechanically bonded to the interior wood substrate. Interior sash corners shall be mortised, tenoned and mechanically fastened.

2. Interior sash materials to be milled from pine, kiln dried to a moisture content of 6-12% at the time of fabrication and treated with a water-repellent preservative.

3. Sash thickness shall be minimum 1-1/2".

4. **Glazing must be able to be field replaced form the interior without requiring the dismantling of the sash, by means of a removable wood interior glazing stop.**

D. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.

1. Supports: Spring-loaded steel pins; four per screen unit.

2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's highest-transparency mesh.

3. Frame Finish: Baked enamel, color to match window exterior color.

E. Operable Sash Weatherstripping: Compressible Bulb; permanently resilient, profiled to effect weather seal.

F. Fasteners: Stainless steel.

G. Sealant and Backing Materials: As specified in Section 079200 of types as indicated.

H. Jamb Liners: Rigid PVC with die-cut EPDM foam backer.

I. Flashing: Provide related flashings, with necessary anchors and attachment devices.

2.04 HARDWARE

A. Operator: Lever action handle fitted to projecting sash arms with limit stops; baked enamel finish.

B. Projecting Sash Arms: Cadmium plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

B. Do not install windows until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Install windows in accordance with ASTM E2112.

C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

D. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

E. Set sill members and sill flashing in continuous bead of sealant.

F. Fill perimeter joint with low pressure flexible polyurethane foam sealant, UL listed, Moisture-resistant skin. See Section 072119.

G. Apply approved sealant in accordance with Section 079200.

H. Install operating hardware.

I. Install glass and infill panels in accordance with Section 088000.

J. Do not puncture aluminum cladding.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inch per 3 ft non-cumulative or 1/8 inch per 10 ft, whichever is less.

3.04 ADJUSTING

A. Adjust hardware, operation, insect screens, and accessories for smooth operation and secure weathertight closure.

3.05 CLEANING

A. Remove protective material from factory finished surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.06 PROTECTION

A. Protect window units from damage or deterioration until time of Substantial Completion.

B. At job completion, exterior and interior finishes are to meet manufacturer’s requirements and are to be free of scratches, dents, dings, etc.

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SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Stile and Rail Wood Doors”.
4. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
5. Division 08 Section “All-Glass Entrances”.
6. Division 08 Section “Automatic Door Operators”.
7. Division 28 Section “Access Control Hardware Devices”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.
c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual overhead door closer bodies.
4. Five years for motorized electric latch retraction exit devices.
5. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:

a. Two Hinges: For doors with heights up to 60 inches.
b. For doors with heights more than 60 inches, provide 1 hinge for every 30 inches of door height greater than 60 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3’0”: 4-1/2” standard weight.
b. Sizes over 3’0” or high frequency: 5” heavy weight.

3. Hinge Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate non-ferrous.

4. Hinge Options: Comply with the following:

    a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

    a. Bommer Industries (BO) - LB Series.
    b. Hager Companies (HA) - CB Series.
    c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - TA Series.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

    a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Hager Companies (HA) - ETW-QC (# wires) Option.
    b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (# wires) Option.

B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE) – EL-CEPT Series.
    b. Securitron (SU) - EL-CEPT Series.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

   a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

   a. Hager Companies (HA) - Quick Connect.
   b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

   a. Door Controls International (DC).
   b. Ives (IV).
   c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

   a. Door Controls International (DC).
   b. Ives (IV).
   c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Ives (IV).
c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Restricted Keyway.

D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.

E. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified cylinders employing a utility patented and restricted keyway requiring the use of patented controlled keys. Provide bump resistant, fixed core cylinders as standard with solid recessed cylinder collars. Cylinders are to be factory keyed where permanent keying records will be established and maintained.

1. Provide a 6 pin multi-level master key system comprised of patented controlled keys and security and high security cylinders operated by one (1) key of the highest level. Geographical exclusivity to be provided for all security and high security cylinders and UL437 certification where specified.

    a. Level 1 Cylinders: Provide utility patented controlled keyway cylinders that are furnished with patented keys available only from authorized distribution.
    b. Level 2 Cylinders: Provide utility patented controlled keyway and side bar locking incorporating unique angled bottom pins for geographical exclusivity. Cylinders constructed to provide protection against bumping and picking.
    c. Level 3 Cylinders: Provide utility patented controlled keyway and side bar locking incorporating unique angled bottom pins for geographical exclusivity. Cylinders to be UL437 certified and constructed to provide protection against bumping, picking, and drilling.
    d. Refer to hardware sets for specified levels.

2. Manufacturers:

    a. Sargent Manufacturing (SA) - Degree Series.

F. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key locks to match Owner's existing system.

G. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

H. Construction Keying: Provide temporary keyed construction cores.

I. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

J. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

K. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) – ML2000 Series.
b. Sargent Manufacturing (SA) – 8200 Series.

B. Multi-Point Locksets: Vertical rod locking devices designed for openings requiring multiple latching points within one locking mechanism. Rods are retracted by dual mounted outside lever trim controls available in a variety of ANSI/BHMA operational functions. Option for single top latching only eliminates the need for bottom strikes.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) – MP9800 Series.
b. Sargent Manufacturing (SA) - 7000 Series.

2.7 ELECTROMECHANICAL LOCKING DEVICES

A. Electromechanical Multi-Point Locks: Vertical rod locking devices designed for openings requiring multiple latching points within one locking mechanism. Rods are retracted by dual mounted outside lever trim controls available in a variety of ANSI/BHMA operational functions. Option for single top latching only eliminates the need for bottom strikes. Electromechanical options include solenoid activated trim, electric latch retraction, and inside and outside lever monitoring.

1. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2. Manufacturers:

a. Corbin Russwin Hardware (RU) MP9800 Series.
b. Sargent Manufacturing (SA) – 7000 Series.

2.8 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - DL4100 Series.
    b. Sargent Manufacturing (SA) - 4870 Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

6. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.

7. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

8. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

9. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

10. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

11. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

12. Rail Sizing: Provide exit device rails factory sized for proper door width application.

13. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
    b. Sargent Manufacturing (SA) - 80 Series.

C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.

2. Provide stabilizers and mounting brackets as required.

3. Provide electrical quick connection wiring options as specified in the hardware sets.

4. Manufacturers:

a. Corbin Russwin Hardware (RU) - 700/900 Series.
b. Sargent Manufacturing (SA) - 980S Series.

2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - DC8000 Series.
    b. Norton Door Controls (NO) – 9500 Series.
    c. Sargent Manufacturing (SA) - 281 Series.

C. Door Closers, Surface Mounted (Unitrol): Unitrol arms to have door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - Unitrol Series.
    b. Norton Door Controls (NO) - Unitrol Series.

2.12 ELECTROMECHANICAL DOOR OPERATORS

A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

B. Standard: Certified ANSI/BHMA A156.19.

C. Performance Requirements:

1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.

E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19.

F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.

G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.

H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Norton Door Controls (NO) - 5600 Series.

2.13 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:

a. Rixson (RF) - 980/990 Series.
b. Sargent Manufacturing (SA) - 1560 Series.

2.14 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Ives (IV).
c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.15 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Hiawatha, Inc. (HI).
b. Ives (IV).
c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

a. Rixson Door Controls (RF).
b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
c. Sargent Manufacturing (SA).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

2.17 ELECTRONIC ACCESSORIES

A. Wireless Card Readers: Card readers to support HID 125 kHz proximity technology or 13.56 MHz contactless smart cards as specified in the hardware sets. Card readers to meet the following minimum design and performance specifications.

1. Reader to wirelessly operate on one 3V CR2 lithium battery.
2. Reader to be suitable for outdoor use.
3. Contactless smart card versions to be compatible with the following technologies: iCLASS, iCLASS Seos, iCLASS SE, ISO1443B UID, Mifare, Mifare Plus, Desfire SE, Desfire EV1, NFC
4. Reader to come pre-paired with an Aperio hub and communicate with the hub via IEEE802.14.4 (2.4 GHz) wireless technology.
5. Aperio hub to communicate with the access control panel using industry standard Wiegand protocol interface.
6. Reader to have green LED status indicator.
7. Reader type and model to meet the design and mounting applications needs of each entry point as indicated on the drawings.

8. Manufacturers:

a. Securitron (SU) – R100 Series.

B. Touchless Switches: FCC certified microwave sensing switch used for REX or activation of various access control devices in place of a traditional wired switch. Unit to have an adjustable sensing zone from 4” to 24”. At exterior locations furnish foam gaskets and weather covers. Provide single gang or double gang unit as specified in the hardware sets

1. Manufacturers:

a. Alarm Controls (AK) - NTS Series.
b. Norton Door Controls (NO) - 700 Series.
c. Securitron (SU) - WSS Series.

C. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) – WT2 Wiegand Test Unit.
b. Sargent Manufacturing (SA) – WT2 Wiegand Test Unit.
c. Yale Locks and Hardware (YA) – WT2 Wiegand Test Unit.

D. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Manufacturers:

a. Securitron (SU) - AQL Series.
b. Altronix (AS) - Maximal 11F.

2.18 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.19 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Section "Closeout Procedures" for project punch and reporting requirements including compliance with approved submittals and verification door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The 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. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate selection for the material and application.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.

B. Section 081113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

C. Section 081416 - Flush Wood Doors: Glazed lites in doors.

D. Section 083613 - Sectional Doors: Glazed lites in doors.

E. Section 084113 - ALUMINUM AND FRP DOORS AND FRAMES: Glazing in doors and transoms.

F. Section 084313 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

G. Section 085113 - Aluminum Windows: Glazing furnished by window manufacturer.

H. Section 085123 - Steel Windows: Glazing furnished by window manufacturer.

I. Section 085200 - Wood Windows: Glazing furnished by window manufacturer.

J. Section 085413 - Fiberglass Windows: Glazing furnished by window manufacturer.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2015).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

F. ASTM C1036 - Standard Specification for Flat Glass 2016.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass 2014.

I. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.

K. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.

L. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2017.

M. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.

N. GANA (SM) - GANA Sealant Manual 2008.

O. GANA (LGRM) - Laminated Glazing Reference Manual 2009.

P. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies 2017.

Q. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2017.

R. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).

S. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data on Insulating Glass Unit, Glazing Unit, Plastic Sheet Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples 2 by 2 inch in sizeof glass units.

E. Certificate: Certify that products of this section meet or exceed specified requirements.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Extra Insulating Glass Units: One of each glass size and each glass type.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.07 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

D. Polycarbonate Sheet Glazing: Provide a five (5) year manufacturer warranty to include coverage for breakage, coating failure, abrasion resistance, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Fabricators:
1. Trulite Glass & Aluminum Solutions, LLC: www.trulite.com.
2. Viracon, Inc: www.viracon.com.
3. Substitutions: See Section 016000 - Product Requirements.

B. Float Glass Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com.
2. Guardian Industries Corp: www.sunguardglass.com.
3. Pilkington North America Inc: www.pilkington.com/na.
4. PPG Industries, Inc: www.ppgideascapes.com.
5. Substitutions: See Section 016000 - Product Requirements.

C. Laminated Glass Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com.
2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com.
3. Substitutions: See Section 016000 - Product Requirements.

D. Fire-Resistance-Rated Glass: Provide products as required to achieve indicated fire-rating period.
1. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL: www.safti.com/#sle.

2. Technical Glass Products; Pilkington Pyrostop: www.fireglass.com/#sle.
3. Vetrotech North America; Contraflam: www.vetrotechusa.com/#sle.
4. Substitutions: See Section 016000 - Product Requirements.

E. Sealed Insulating Glass Units:
1. Cardinal Glass Industries: www.cardinalcorp.com.
2. Any of the manufacturers specified for float glass.
3. Substitutions: Refer to Section 016000 - Product Requirements.

2.02 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.
5. Labeling: Provide permanent label on each piece giving the information required by Section 2403.1 of the Building Code of New York State.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
1. Laminated Safety Glass: Comply with 16 CFR 1201 test requirements for Category II.
2. Plastic Interlayer:

C. Fire-Protection-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
1. IBC Fire Protection Rating: As indicated on the door and frame schedule.
2. Provide products listed by Underwriters Laboratories.
3. Safety Certification: 16 CFR 1201 Category II.
4. Labeling: Provide permanent label on each piece giving the IBC rating and other information required by Section 715.5 of the Building Code of New York State.
5. "Not-Hose-Stream-Rated" Products: Where D-20 (or D-NH-NT-20) rating is indicated, provide one of the following products or any T-rated or NT-rated product specified above.

D. Sealed Insulating Glass Units: Types as indicated.
1. Application: Exterior, except as otherwise indicated.
2. Durability: Certified by an independent testing agency to comply with ASTM E2190.
3. Edge Spacers: Thermally-broken, Polyurethane polymer and anodized aluminum, bent and soldered corners; Product "XL Warm Edge Spacer" by Cardinal Glass Industries: www.cardinalcorp.com
4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
5. Edge Seal Color: Clear anodized.
6. Purge interpane space with dry hermetic air.

E. Patterned Glass: Cast or molded glass.
1. Manufacturers:
a. Oldcastle Glass: www.oldcastleglass.com.
b. Ceramic Enamel Frit.
c. Color: Solargray
d. Substitutions: Refer to Section 016000 - Product Requirements.

2.03 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   4. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   3. Solar Optical Properties: Comply with NFRC 300 test method.

2.04 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
   2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
   4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
   2. Ionoplast Interlayer: 0.035 inch thick, minimum.

C. Labeling: Provide permanent label on each piece giving the information required by Section 2406 of the Building Code of the State of New York.

2.05 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

C. Manufacturers:

1. BASF Corporation: www.basf.com/us/en.html.
2. Bostik Inc: www.bostik-us.com.
3. Momentive Performance Materials, Inc: www.momentive.com.
4. Pecora Corporation: www.pecora.com.
5. Substitutions: See Section 016000 - Product Requirements.

2.06 ACCESSORIES

A. Setting Blocks: Neoprene, EPDM, or Silicone, 80 to 90 Shore A durometer hardness, ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
   1. Manufacturers:
      a. Pecora Corporation: www.pecora.com.
      b. Tremco Global Sealants: www.tremcosealants.com/#sle.
      c. Substitutions: See Section 016000 - Product Requirements.
   2. Compliant with AAMA A804.1 for normal use, and AAMA A807.1 where much thermal movement is anticipated.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
   1. Where small lites, such as in doors, can be glazed with a continuous preformed elastomeric glazing extrusion, use a gasket of the dense formulation, complying with ASTM C864, Option 1, compressed to watertightness outside and inside, with either a bent joint or a tightly compressed cut joint at corners.

E. Glazing Clips: Manufacturer's standard type.

2.07 DECALS

A. Description: Self-adhering acrylic or polyester sheet material with silk screened logo or lettering in one-color design as directed by Architect.
   1. Size: Per Code.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Where frames are out of square, out of plane, subject to excessive deflection, or where substrates contain bond breaking substances, moisture, unsound material, or where there are other conditions unsuitable for proper installation or performance of the glazing work, do not start glazing work until defective earlier construction has been completed or corrected.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Do not glaze wet, damp, or uncured surfaces.

E. Verify that sealing between joints of glass framing members has been completed effectively.

F. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

B. Installation includes such work as surface preparation, priming, cleaning, protecting, and repairing or replacing defective and damaged work.

C. Orient glass so that wave and other distortions run horizontally.

D. At fixed lites which extend within 18 in. of floor, place permanent decals 54 in. off floor, 24 in. o.c. maximum, but not closer than 12 in. edge-to-edge. At doors with lites which extend within 18 in. of floor, place one decal 54 in. off floor, in center of lite width.

3.04 INSTALLATION - EXTERIOR/INTERIOR DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - INTERIOR WET GLAZING METHOD (COMPOUND AND COMPOUND)

A. Application - Interior Glazed: Set glazing infills from the interior of the building.

B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.

C. Locate and secure glazing pane using glazers' clips.

D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.06 INSTALLATION - EXTERIOR WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
   1. Place glazing tape on glazing pane of unit with tape flush with sight line.

G. Fill gap between glazing and stop with BS type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

H. Apply cap bead of BS type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.07 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

A. After installation, identify glazed areas by hanging narrow streamers from walls and mullions. Do not mark glass nor affix decals to glass.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 088300
MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors for exercise rooms.

1.02 REFERENCE STANDARDS

A. ASTM C1036 - Standard Specification for Flat Glass 2016.

B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.

C. GANA (GM) - GANA Glazing Manual 2008.

D. GANA (SM) - GANA Sealant Manual 2008.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds: Submit chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Samples: Submit two samples, 12 x 12 inch in size, illustrating mirrors design, edging, and coloration as well as two full size samples of mirror clips.

E. Manufacturer's Certificate: Certify that mirrors, meets or exceeds specified requirements.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.

B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

1.05 FIELD CONDITIONS

A. Do not install mirrors when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 MATERIALS

A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.

B. Mirror Glass : ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality Q2 (mirror); four (4) layer reflective coating system on back, consisting of chemically deposited silver, electrically or chemically deposited copper, paint coat, and protective organic coating; physical characteristics complying with ASTM C1503; 6.0 mm minimum thick.

1. Thickness: 1/4 inch.

2. Size: As indicated on drawings.

3. Protective Organic Coating: Heavy duty coating

a. Carolina Mirror; Product: "Poly-Glaze": www.carolinamirror.com

b. PPG Industries; Product: "Diamondback": www.ppgindustries.com.

c. Substitutions: See Section 016000 - Product Requirements.

4. Tempering: Fully temper mirrors.

5. Edge Treatment: Treat and seal to prevent moisture, chemical, and atmospheric penetration of backing.

2.03 ACCESSORIES

A. Mirror Attachment Accessories: Aluminum "J" channel.

1. Manufacturer: C.R. Laurence Co., Inc.

B. Mirror Adhesive: Silicone pre-polymer based, chemically compatible with mirror coating and wall substrate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for mirrored glazing are correctly sized and within tolerance.

B. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

3.03 INSTALLATION

A. Install mirrors in accordance with manufacturer's recommendations.

B. Set mirrors plumb and level, and free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

D. Frameless Mirrors: Set mirrors in proper place with adhesive, applied in accordance with adhesive manufacturer's instructions.

1. For large mirrors, provide "J" channel at bottom of mirror, screwed to wall studs. Apply mirror with adhesive and set in channel.

3.04 CLEANING

A. Remove labels after work is complete.

B. Clean and polish mirrors and adjacent surfaces by methods that will not harm surface or backing.

3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

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SECTION 089100
LOUVERS AND GRILLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 233113 - Metal Ductwork: Ductwork attachment to louvers .

C. Section 233700 - Air Outlets and Inlets: Louvered penthouse.

1.03 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.04 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).

B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2015.

C. AMCA 501 - Application Manual for Louvers; Air Movement and Control Association International, Inc.; 2009.

D. AMCA A540 Test Methods for Louvers Impacted by Wind Borne Debris

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames; weep paths gaskets, flashing, sealant and other means of preventing water infiltration.

D. Initial Selection Samples: Submit manufacturer's full line of standard color selections of actual material samples for units with factory-applied finishes.

E. Verification Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.

F. Test Reports: Independent agency reports showing compliance with specified performance and design criteria.

G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.07 **FIELD CONDITIONS**

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.

1. Finish: Include coverage against degradation of exterior finish for a period of twenty years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Louvers:

1. Airolite Company, LLC: www.airolite.com.

2. American Warming and Ventilating: www.awv.com/#sle.

3. Construction Specialties, Inc; Acoustical Louver: www.c-sgroup.com/#sle.

4. Pottorff: www.pottorff.com.

5. Ruskin Air & Sound Control: www.ruskin.com.

2.02 DESIGN CRITERIA

A. Manufacturer shall design and furnish all supports required to withstand the specified wind load. Louver blades, frames, mullions and anchorages shall be demonstrated to withstand the

specified wind load.

2.03 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA 540 - Miami-Dade Qualified / Florida Product Approved.

1. Wind Load Resistance: **Design to resist positive and negative wind load as indicated on the drawings, but not less than 25 psf without damage or permanent deformation.**

2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.

3. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.

4. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

B. StationaryLouvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.

1. Free Area: 50 percent, minimum.

2. Beginning Point of Water Penetration: Not less than 900 fpm (4.7 m/s).

3. Blades: Drainable.

a. Aluminum Thickness: 0.081 inch nominal wall thickness if RO is equal to or less than 96.5 inches. **If RO is greater than 96.5 inches, frame thickness shall be 0.125 inch nominal thickness.**

4. Frame: Depth as indicated on drawings, channel profile; corner joints mitered and , with continuous recessed caulking channel each side.

a. Frame Type: Non-Flanged (Standard), unless otherwise indicated.

b. Aluminum Frame Thickness: 8 gage, 0.125 inch minimum; blades {\ch\#2}

5. Finish: Polyvinylidene fluoride or Fluoropolymer coating, finished welded units after fabrication.

6. Color: As selected by Architect from manufacturer's full color range.

2.04 ACCESSORIES

A. Screens: Frame of same material and color as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

1. Secure with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

B. Fasteners and Anchors: Stainless steel.

1. For color-finished louvers, use fasteners and anchors with heads that match the louver color.

C. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated on shop drawings.

3.02 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.03 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

E. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required.

F. Provide perimeter reveals and openings of uniform width for sealants and joint fillers.

G. Coordinate with installation of mechanical ductwork.

3.04 **RESTORATION**

A. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

B. Touch up minor abrasions in finishes with air-dried coating that is compatible with and matches color and gloss of the factory finish coating.

3.05 CLEANING

A. After installation, clean exposed surfaces and components of louvers, which are not protected by temporary coverings, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Strip protective finish coverings.

C. Clean surfaces and components, prior to final inspection, with water and a mild soap or detergent not harmful to finishes. Rinse surfaces thoroughly and dry.

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