PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96915
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: www.portguam.com

Lourdes A. Leon Guerrero
Governor of Guam
Joshua F. Tenorio
Lieutenant Governor

August 29, 2024

Welder Shop Upgrades and Repairs

INVITATION FOR BID IFB-PAG-024-002

ADDENDUM NO. 1

ALL PROPOSERS MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON AREA PROVIDED BELOW AND RETURN COPY TO PAG PROCUREMENT OFFICE:
Email: pacastro@portofguam.com, pagprocurement@portofguam.com, spmuna01@portofguam.com, and algsablan@portofguam.com, or Fax: (671) 472-1439

NOTICE TO OFFERORS: The IFB Documents attached and listed below reference the above IFB project are hereby attached for your review, and are now to be included into the IFB packet.

1. **Pre-Bid Summary**
2. **Pre-Bid/ Site Visit Attendance**
3. **Pre-Bid Agenda**
4. **Questions and Responses and Attachments**

****** END OF ADDENDUM NO. 1******

Issued by:

RORY J. RESPICIO
General Manager

ACKNOWLEDGEMENT

NAME:_____

COMPANY:_____

DATE/TIME:_____

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Pre-Bid Conference Summary
Friday, August 9, 2024 10:00am

On August 9, 2024 PAG Procurement held a pre-bid conference in the Board of Director's conference room for IFB 024-002 Welder Shop Upgrades and Repairs.

Pre-Bid Conference was set for 10:00AM and 11 potential bidders attended (please see attached attendance sign-in sheet. In attendance for the Port were Steven Muna, Annie Sablan, Joe Javellana, Clarence Lagutang, Jimmy Dacasin, Jerome Valdez, Jacob Aquiningoc, Justin Santos, Chris Aguon, and Jared Perez.

The potential bidders in attendance were informed of the required services for this bid. Bidders were reminded of the important dates to note for the Q&C's and the bid submittal deadlines.

Procurement reminded bidders that 1 original, 2 copies, and one electronic PDF format on CD or USB was required in the sealed envelope. Under the section of special reminders, bidders would acknowledge and submit all the required forms as listed on the agenda. The successful bidder awarded would be provided an NTP, issued by the PAG Engineering Division at the pre-construction meeting.

During the pre-bid conference, Jacob Aquiningoc, from PAG CIP Engineering Division, conducted a power point presentation, in order to provide a visual of the project and address any question the potential bidders might ask during the pre-bid conference. The Power Point also provided an a visual to all bidders of what to expect and look for during the site visit.

At the end of the conference potential bidders were informed that the Questions and Responses (if any) would be prepared in an addendum along with this pre-bid agenda and sign-in sheet and sent to all who have registered. Also that due to the technical aspects of the scope of work & the site visit, questions concern or clarifications must be in writing and addressed to the Port's General Manager Mr. Rory J. Respicio. All were reminded that nothing stated in the pre-bid conference shall change the IFB unless through a written amendment §3109 (g)(4), which will be sent to bidders who have officially registered with PAG and be posted on the Port's Website, https:// portofguam.com/bids-and-rfps.

Those in attendance were also reminded of the restriction against contractors employing convicted sex offenders from working at Government of Guam venue. The conference ended by 10:40AM.

IFB 024-002 WELDER SHOP UPGRADES AND REPAIRS (FEDERALLY FUNDED PROJECT)

Sign-In sheet for Pre-Bid Conference Site and Visit (10:00am) Friday, August 9, 2024

NO.	Name	Company	Email	Contact No.		Site Visit
1	JUN BINOYA	DOOALL	junbinoya1@gmail	671-797-709[illegible]		✓
2	NESTOR YAYA	DOOALL	nestorbyaya@dooall.us	4838266		✓
3	DENNIS QUIDATO	DOOALL	dennis@dooall.com	671-727-8623		✓
4	Myun J Park	DooAll	mjpark@dooall.us	671-888-7[illegible]		✓
5	Xue Jun Gu	Guam Evergreen Cons Cy	guam evergreen cy :	671-689-8889		✓
6	EMER OCAMPO	SURFACE SOLUTIONS	engineer.surfacesolutionsguam.com	4835202		✓
7	ROLANDO NEW VILLANUEVA	K-EYS CONSTRUCTION	rynewvillanueva@yahoo.com	671 482-4950		✓
8	RALPH NAVARRO	RN BUILDERS CORP	rnbuilders.guam@gmail.com	671 998 04 19		✓
9	Joo Bae Park	Eastern Company corpor	phillip.park@easternpacific.com	671-747-7944		✓
10	Erenn Redoble	JJ Global Services	erenn@jjglobal.services	689-3615		✓
12	Rogelio Tipay Jr	BME & Sons Inc.	rtipayjr@bmesons.com	632-3338		✓
13	[illegible] Duenas	CLPNT	SALES@OMNICPOINT INTL.COM	483-9222		✓
14	LOY ESCABILLAS	SBBC / MEGA United	loy@southbaybuilders.net	8898866		✓
15	FERNANDO ESCABILLAS	SBBC / MEGA United	ryan@southbaybuilders.net	8898866		✓
16	WILLY RANOLA	IAN CONST	WRANOLA@IANCONST.COM	671-687-7041		✓
17	Joobong Kim	IAN corporation	jkim@ianconstruction.com	688-4903		✓

IFB 024-002 WELDER SHOP UPGRADES AND REPAIRS (FEDERALLY FUNDED PROJECT)

Sign-In sheet for Pre-Bid Conference Site and Visit (10:00am) Friday, August 9, 2024

18	Steve Munca	PAG				
19	Annie LG Sablan	"				
20	Joe Savellano	"				
21	Clarence Laguitang	"				
22	Jimmy Dacasin	"				
23	Jerome Valdez	"				
24	Jacob Aquinepc	"				
25	Justin Santos	"				
26	Chris Aguon	"				
27	JAMES PEREZ	"				
28						
29						
30						

PRE-BID CONFERENCE AGENDA

IFB-PAG-CIP-024-002
WELDER'S SHOP UPGRADES AND REPAIRS

Date: FRIDAY, AUGUST 9, 2024 **Time: 10:00 a.m.** **Location: PAG Boardroom**

I. **Introduction**
   a. PAG Representatives
   b. Others

II. **Intent and Purpose**

Intent of IFB: The Jose D. Leon Guerrero Commercial Port or Port Authority of Guam is interested in soliciting an Invitation for the Welder Shop Upgrades and Repairs. This project is funded with federal funds from the Department of Interior. The Welder's Shop is approximately a 40+ year old building, that is in dire need of Upgrades and Repairs due to its age, damages from storms and the harsh working environment. This project will repair concrete spalls and cracks throughout the building, apply a protective coating on the roof and walls, install three new roll-up doors, and replace existing light fixtures. A more detailed scope of work is in the bid packet.

All systems shall meet the standard compliance of organizations for the American National Standard Institute (ANSI), American Society for Testing & Materials (ASTM), Underwriter Laboratories (UL), & Occupational Safety & Health Association (OSHA). Contractors are encouraged to visit the site on a scheduled date set by Procurement and Engineering/CIP Division.

Purpose of Pre-Bid: This meeting is to explain the requirements of this IFB and provide the potential Bidder(s)/Firm(s) a better understanding of the solicitation process.

III. **Description of Services:** The services required labeled as Scope of Work and Photos are found in Volume 5 in the IFB package.

IV. **IFB Process and Requirements**
   a. **Questions, Concerns and Inquiries (Q&C)** Deadline: **Friday, August 16, 2024** no later than **5:00 p.m.**

   b. **BID SUBMITTAL**: **Friday, August 30, 2024** before or up until **2:00 P.M. Chamorro Standard Time (Guam Time)**, 1st floor Port Procurement Office Admin. Bldg.

   c. Bid Opening: **Friday, August 30, 2024 immediately** after bid submittal time has expire and no more bids are being accepted, opening will take place in the Port Authority of Guam, Board of Directors Conference Room.

   d. Required copies: 1 original, 2 copies and 1 CD containing electronic file copy in PDF format.

   e. Special Reminders to Prospective Bidders

   f. Required Forms for Submittal
      1. Competency of Bidders Requirements
      2. Bid Form and Bid Schedule
      3. Bid Security 15% of Bid Amount
      4. Affidavit Disclosing Ownership commissions **(AG Form 2)**
      5. Affidavit Re Non-Collusion **(AG Form 3)**
      6. Affidavit Re NO Gratuities or Kickbacks **(AG Form 4)**
      7. Affidavit Ethical Standards **(AG Forms 5)**

8. Declaration Re Compliance with U.S. DOL Wage Determination **(AG Form 6)**
9. Affidavit Re Contingent Fees **(AG Form 7)**
10. Special Provision on Sex Offenders

g. Notice to Proceed will be issued by PAG Engineering Division at Pre- Construction meeting.

V. An Addendum will be prepared for today's meeting minutes, which will reflect clarifications with regards to today's pre-bid meeting. Due to the technical aspects of the scope of work & the site visit questions concerns or clarification will be in writing and will be addressed to Port General Manger Mr. Rory J. Respicio.

a. **Questions, Concerns and Inquiries**: Deadline to submit: **Friday, August 16, 2024, NO LATER THAN 5 P.M.** Address to: RORY J. RESPICIO, General Manager at **rjrespicio@portofguam.com** via fax @ 472-1439 please copy in email Steven P. Muna, Contract Management Administrator at **spmuna01@portofguam.com,** and **pagprocurement@portguam.com.**

b. **Reminder:** Nothing stated at the Pre-Bid Meeting shall change the IFB unless a change is made by written amendment (§3109(g) (4)), which will only be sent to bidders who have officially registered with PAG.

Please note that all Amendments will only be sent to all bidders who have officially registered with the PAG and Posted on the Port Authority's website: www.portguam.com

c. **Restrictions:** Volume 1, General Information & Instructions to Bidders, Section III. COMPLIANCE WITH LAWS AND MANDATORY FORMS FOR SUBMITTAL, Item 10. Restriction Against Contractors Employing Convicted Sex Offenders from Working at Government of Guam Venue. (Subsection 5253 of Title 5 Guam Code Annotated), found on Page 9.

VI. **Site Visit – Rules and Regulations, Policies and Procedures.** Scheduled for Friday, August 9, 2024 immediately after pre-bid conference. Names of all site visit attendees must be submitted 24-hours prior to site visit for purposes of vetting by the Port Police Division. Safety is a priority. Photo restrictions.

VII. **Meeting adjourned.** **Time:** 10:40 Am

Procurement Staff Initial:

Question and Concerns

IFB 024-002 Welder Shop Upgrades and Repairs

Question No. 1: At page 121 (5.c.) Roll-up door must be made of galvanized steel, but in the specs **2.3.D. (page 143)** curtain slats to be fabricated from aluminum sheets. Please advise if the curtain is to be galvanized or aluminum?

PAG Response: The attached specifications call for aluminum, however, please take note of the components that have been identified in the specifications as galvanized steel.

Question No. 2: At page 121 (5.d.) Roll-up door must be epoxy coated. Is this also applicable to curtains (factory finish)?

PAG Response: Epoxy coating is to be applied to all mounting hardware (bolts, nuts, washers, rail, etc.) Curtain is not included. The factory finishing should be coordinated with PAG Engineering.

Question No. 3: At page 147 (2.8.G.) the specs make mention to fire doors and automatic closing devices. Do these doors need to be fire doors?

PAG Response: (a)Regarding the fire rating of the roll-up door, PAG does not specify the level of fire rating, however, the supplied door must have a fire rating consistent with UL standards.

(b) The supplied roll-up doors do not need to be equipped with an automatic closing device.

Question No. 4: At page 143 (2.3.D.1.) standard continuous gasket between slats. Our reliable supplier, have not encountered that before. Is this portion can be excluded?

PAG Response: The curtain slats provided must be connected in such a way as to ensure water does not penetrate into the building.

Question No. 5: In preparation of our bid proposal for the above subject, our team would like to request the following: a) Information about exposure category of the building? b) Electronic copy of Project Specification prepared by N.C. Macario.

PAG Response: a) Exposure category of the building should be determined by a licensed engineer.

b) An electronic copy of the specifications can be provided.

8/26/2024

Clarence V. Lagutang / Date
CIP Manager

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Service doors.
2. Insulated service doors.
3. Fire-rated service doors.
4. Fire-rated, insulated service doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.
2. **Section 099113 "Exterior Painting" and Section 099123 "Interior Painting"** for finish painting of factory-primed doors.
3. Section 111200 "Parking Control Equipment" for parking control equipment interlocked to overhead coiling doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
3. Include description of automatic-closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, and method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
5. Show locations of controls, locking devices, and other accessories.
6. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

1.4 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than **two** hours' normal travel time from Installer's place of business to Project site.

B. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **Two** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Wind Loading

Design and fabricate door assembly to withstand the wind loading pressure of 170 miles per hour. Provide test data showing compliance with ASTM E330. Sound engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested. Ensure complete assembly meets or exceeds the requirements of ASCE 7.

2.3 DOOR ASSEMBLY

A. Door: Overhead coiling door formed with curtain of interlocking metal slats.

1.

B. Operation Cycles:. Design all portions of the door, hardware and operating mechanism that are subject to movement, wear or stress fatigue to operate through a minimum number of 10 cycles per day. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1. Include tamperproof cycle counter.

C. Door Curtain Material: Fabricate overhead ceiling door curtain of interlocking curved slate designed to withstand required wind loading, of continuous length for width of door without splices. Unless otherwise indicated, provide slats of material gage recommended by door manufacturer for size and type of door required.

D. Door Curtain Slats: Provide curtain slats fabricated from aluminum sheets. .
1. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

E. Bottom Bar: Two angles, each not less than50 x 50 millimeter by 4.8 millimeter; fabricated from **stainless steel extrusion** conforming to ASTM A66, type 304.

F. Curtain Jamb Guides: **Galvanized steel]** with exposed finish matching curtain slats.

G. Hood: **Aluminum** Provide a hood with flanged at top for attachment to leader and flanged at bottom to provide longitudinal stiffness. The hood encloses the curtain coil and counter balance mechanism.

H. Locking Devices: Equip door with **slide bolt for padlock** Located on both left and right jamb slides, operable from coil side.

I. Manual Door Operator: **Chain-hoist operator.**

1. Provide operator with through-wall shaft operation.
2. Provide operator with manufacturer's standard removable operating arm.

J. Electric Door Operator:

1. Usage Classification: Provide motors which are high-starting torque, reversible, constant-duty electrical with overload protection of sufficient torque and wattage to move the door in either direction from any position. Ensure they produce a door-travel speed of not less than 0.2 or more than 0.3 meter per second without exceeding the wattage rating.
2. Operator Location: **Top of hood** assembly and connected to the door drive shaft with drive chain and sprockets.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; **moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. (2.44 m) or lower.**
4. Motor Exposure: **Interior.**
5. Motor Electrical Characteristics:
   Provide electrical wiring and door operating controls conforming to the applicable requirements of NFPA 70
6. Emergency Manual Operation: **Chain** type.
7. Control Station(s): **Interior mounted** Provide control enclosures that conform to NEMA ICS 6 for general purpose NEMA Type 1.

K. Curtain Accessories: Equip door with **smoke seals weather seals astragal push/pull handles pull-down strap pull hook and automatic-closing device.**

L. Door Finish:

1. Aluminum Finish: **Clear anodized**\
2. \
3. Factory Prime Finish: Manufacturer's standard color.
4. \

M. \

N. \

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Aluminum Door Curtain Slats: ASTM B209 (ASTM B209M) sheet or ASTM B221 (ASTM B221M) extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch (1.27 mm); and as required.
   2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.
   3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with **minimum aluminum thickness of 0.032 inch (0.80 mm)**

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, **and a continuous bar for holding windlocks**.

C. Pass Door(s): Swinging-door and frame assembly constructed integrally with the coiling-door assembly. Comply with the accessibility standard of authorities having jurisdiction.

   1. Door Frame and Integral Jamb Guide: Fabricate of angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading.
   2. Hinged Frame: Hinged pass door and frame that swings out of the way, as a unit, to allow use of the full coiling-door opening width. One jamb of the pass-door frame is hinged and the other jamb includes a guide for the lower, narrower part of the coiling-door curtain.
   3. Rigid Frame: Rigid pass door and frame that are built into the rigid, lower part of the door curtain and that raise with the curtain.
   4. Locking Hardware:

      a. **Lockset Exit Hardware**: **As specified in Section 087100 "Door Hardware.".**
      b. Lock Cylinders: As **specified in Section 087100 "Door Hardware"**.
      c. Keys: **Three** for each cylinder.

   5. Thresholds: Equip pass doors with integral thresholds that comply with the accessibility standard of authorities having jurisdiction.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Aluminum: 0.040-inch- (1.02-mm-) thick aluminum sheet complying with ASTM B209 (ASTM B209M), of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.
2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

B. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling unless otherwise indicated.

2.7 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: As **specified in Section 087100 "Door Hardware".**
2. Keys: **Three** for each cylinder.

C. Chain Lock Keeper: Suitable for padlock.

D. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

1. At door head, use 1/8-inch- (3-mm-) thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, **flexible, 1/8-inch- (3-mm-) thick seals of flexible vinyl, rubber, or neoprene.**

C. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

D. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

E. Pull-Down Strap: Provide pull-down straps for doors more than 84 inches (2130 mm) high.

F. Poll Hooks: Provide pole hooks and poles for doors more than 84 inches (2130 mm) high.

G. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. **Testing for manually operated doors shall allow resetting by opening the door without retensioning the counterbalance mechanism Release mechanism for motor-operated doors shall allow testing without mechanical release of the door.** Automatic-closing device shall be designed for activation by the following:

1. Replaceable fusible links with temperature rise and melting point of **165 deg F (74) deg C)** interconnected and mounted on both sides of door opening.
2. Manufacturer's standard UL-labeled smoke detector and door-holder-release devices.
3. Manufacturer's standard UL-labeled heat detector and door-holder-release devices.
4. Building fire-detection, smoke-detection, and -alarm systems.

2.9 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, **seamlessorwelded** carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum **25-lbf (111-N) 30-lbf (133-N** force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.11 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch,

control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.

1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.

D. Motors: Reversible-type motor **with controller (disconnect switch)** for motor exposure indicated for each door assembly.

1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. **For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.**

1. 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 sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

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

3. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.

G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed **30 lbf (133 N)**.

I. 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.

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

K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.
1. .

2.12 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.13 ALUMINUM FINISHES

A. Mill Finish: Manufacturer's standard.

B. Clear Anodic Finish: AAMA 611, **AA-M12C22A41, Class I, 0.018 mm**.

C. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

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

3.2 INSTALLATION, GENERAL

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: **Engage** a qualified testing agency to perform tests and inspections and to furnish reports to Architect.

B. Perform the following tests and inspections **with the assistance of a factory-authorized service representative**:

1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.

3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

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

1. Adjust exterior doors and components to be weather resistant.

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

C. Adjust seals to provide tight fit around entire perimeter.

END OF SECTION 083323

SECTION 087100 - DOOR HARDWARE

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

B. Section Includes:

1. Mechanical door hardware for the following:
    a. Swinging doors.
    b. Sliding doors.
    c. Folding doors.
2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

C. Related Requirements:

1. **Section 064113 "Wood-Veneer-Faced Architectural Cabinets"** for cabinet door hardware provided with cabinets.
2. Section 081113 "Hollow Metal Doors and Frames" **for astragals provided as part of labeled fire-rated assemblies and for door silencers provided as part of hollow-metal frames.**
3. .
4. Section 081213 "Hollow Metal Frames"**for door silencers provided as part of hollow-metal frames.**
5. Section 081216 "Aluminum Frames" for door silencers provided as part of aluminum frames.
6. Section 081416 "Flush Wood Doors" for**astragals**
7. Section 083113 "Access Doors and Frames" for access door hardware, **including** cylinders.
8. Section 083323 "Overhead Coiling Doors" for door hardware provided as part of overhead coiling door assemblies.
9. Section 083513 "Folding Doors" for pulls, latches, hinges, guides, and pivots provided as part of the folding door package.
10. Section 133419 "Metal Building Systems" for door hardware, **including** cylinders.
11.
12. Section 283100 "Intrusion Detection" for detection devices installed at door openings and provided as part of an intrusion-detection system.
13. Section 284621.11 "Addressable Fire-Alarm Systems" for connections to building fire-alarm system.
14. Section 284621.13 "Conventional Fire-Alarm Systems" for connections to building fire-alarm system.

1.2 ALLOWANCES

A. Door hardware is part of **Door Hardware Allowance.**

1.3 COORDINATION

A. Floor-Recessed Door Hardware: Coordinate layout and installation with floor construction.

1. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For electrified door hardware.

1. Include diagrams for power, signal, and control wiring.
2. Include details of interface of electrified door hardware and building safety and security systems.

C. Samples: For each exposed product in each finish specified, in manufacturer's standard size.

1. Tag Samples with full product description to coordinate Samples with door hardware schedule.

D. Samples for Initial Selection: For each type of exposed finish.

E. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule **or concurrent with** submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format **and use same door numbers** as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

    a. Identification number, location, hand, fire rating, size, and material of each door and frame.
    b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
    e. Fastenings and other installation information.
    f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
    g. Mounting locations for door hardware.
    h. List of related door devices specified in other Sections for each door and frame.

F. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.
1. .

1.5 RELATED DOCUMENTS

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an **Architectural Hardware Consultant (AHC)**.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to the Contractor.

D. Deliver keys**and permanent cores** to the contractor by registered mail or overnight package service.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

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

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: **Three** years from date of Substantial Completion unless otherwise indicated below:

a. Locks: **Five** years from date of Substantial Completion.
b. Exit Devices: **Two** years from date of Substantial Completion.
c. Manual Closers: **10** years from date of Substantial Completion.
d. Concealed Floor Closers: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of door hardware from single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

2. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
3. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

4. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.2 HINGES

A. Hinges: BHMA A156.1. **Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.** Hinges shall be the product of Bommer Industries, Itager, The Stanley Works or McKinney or approved equal.

2.3 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: BHMA A156.17.

2.4 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

1.

2.5 LOCKS

1. Levers and knobs shall be cast or solid metal. All internal working parts shall be stainless steel and latches shall be the product of one of the following:

B. Lock
C. Best 30H x equal design
D. Sargent 18-8100 x equal design
E. Sohlage L9000 x 03A
F. Yale 8700FL x Equal design
G. 2. Successful Lock manufacturer must furnish a mounted sample of their lock and designs prior to final approval.

2.6 RELATED DOCUMENTS

A. Drawings and general provisions of the contract General and Supplementary conditions and Divisions I Specifications including Sections, apply to the Section.

1.

B. Everything necessary for and incidental to the execution and completion of all door hardware work as indicated on the drawings and specified herein.

1.

2.7 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

2.8 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

2.9 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic Flush Bolts: BHMA A156.3, Type 25; minimum 3/4-inch (19-mm) throw; with dust-proof strikes; designed for mortising into door edge.

B. Self-Latching Flush Bolts: BHMA A156.3, Type 27; minimum 3/4-inch (19-mm) throw; with dust-proof strikes; designed for mortising into door edge. **Include wear plates.**

2.10 EXIT / PANIC DEVICES

A. Exit Devices and Auxiliary Items: BHMA A156.3.Exit/Panic devices shall be the product of Von Daprin or Approved Equal.

2.11 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock.

1. No Master Key System: Only change keys operate cylinders.
    a. Provide three cylinder change keys.
2. Master Key System: Change keys and a master key operate cylinders.
    a. Provide three cylinder change keys and five master keys.
3. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
    a. Provide three cylinder change keys and five each of master and grand master keys.
4. Great-Grand Master Key System: Change keys, a master key, a grand master key, and a great-grand master key operate cylinders.
    a. Provide three cylinder change keys and five each of master, grand master, and great-grand master keys.
5. Existing System:

a. Master key or grand master key locks to Owner's existing system.
b. Re-key Owner's existing master key system into new keying system.

6. Keyed Alike: Key all cylinders to same change key.

B. Keys: **Nickel silver.**

1. Stamping: Permanently inscribe each key with a visual key control number and include:

2.12 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of **150** > percent of the number of locks.

2.13 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.14 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Door closers shall be the product of LCN closers or approved equal.

2.15 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1.

2.16 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.

2.17 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.Stops shall be the product of Glynn Johnson. Hager, Yale or Approved Equal.

1.

2.18 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:

1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
3. Gasketing on Double Doors: 0.50 cfm per ft. (0.000774 cu.) m/s per m) of door opening.

2.19 THRESHOLDS and WEATHERSTRIPPING

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated. Threshold and weather stripping shall be the product of Reese, Pemko, Hager, National Guard, Zero or approved equal.

2.20 SLIDING DOOR HARDWARE

A. Sliding Door Hardware: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>

2.

3.

2.21 AUXILIARY DOOR HARDWARE

2.22 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

a. Wood or Machine Screws: For the following:

1) Hinges mortised to doors or frames; **use threaded-to-the-head wood screws for wood doors and frames**
2) Strike plates to frames.
3) Closers to doors and frames.

b. Steel Through Bolts: For the following unless door blocking is provided:

1) Surface hinges to doors.
2) Closers to doors and frames.
3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.23 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

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

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights **indicated on Drawings to comply with the following** unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's 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. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as **indicated in keying schedule**.
2. Furnish permanent cores to Owner for installation.

F. Key Control System:

1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.

G. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

H. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

I. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

J. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

K. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: **Engage** a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed 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.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
2. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 70 degrees and so that closing time complies with accessibility requirements of authorities having jurisdiction.
3. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

B. Occupancy Adjustment: Approximately **three** months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include **12** months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass products.
2. Laminated glass.
3. Insulating glass.
4. Glazing sealants.
5. Glazing tapes.
6. Miscellaneous glazing materials.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at **Project site**.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of **glass** indicated except for clear-monolithic glass products **the following products** and 12 inches (300 mm) square.
   1. Laminated glass.
   2. Insulating glass.

C. Glazing Accessory Samples: For **sealants and colored spacers,** in 12-inch (300-mm) lengths. **Install sealant Samples between two strips of material representative in color of adjoining framing system.**

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For **Installer, manufacturers of fabricated glass units, glass testing agency and sealant testing agency**.

B. Product Certificates: For glass.

C. Product Test Reports: For **fabricated glass and glazing sealants,** for tests performed by a qualified testing agency.

   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved **and certified** by primary glass manufacturer.

B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors **and who employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program.**

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than **eight** Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain **tinted and coated** glass from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
   1. Probability of Breakage for Sloped Glazing: For glass sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
   2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
   3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

   1. For monolithic-glass lites, properties are based on units with lites **of thickness indicated.**
   2. For laminated-glass lites, properties are based on products of construction indicated.
   3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   4. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on LBL's WINDOW 7 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
   5. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on LBL's WINDOW 7 computer program.
   6. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.
   7.

2.3 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

   1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
   2. Construction: Laminate glass with **polyvinyl butyral interlayer** to comply with interlayer manufacturer's written instructions.
   3. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   4. Interlayer Color: Clear unless otherwise indicated.

2.4 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

1. Sealing System: Dual seal, with **manufacturer's standard**primary and secondary sealants.

2. Perimeter Spacer: **Manufacturer's standard spacer material and construction**

   a. <Double click here to find, evaluate, and insert list of manufacturers and products.>

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.5 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: **As selected by Architect from manufacturer's full range of industry colors.**

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
   1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:

1. **Neoprene** with Shore A durometer hardness of 85, plus or minus 5.
2. Type recommended in writing by sealant or glass manufacturer.

D. Spacers:

1. **Neoprene** blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
2. Type recommended in writing by sealant or glass manufacturer.

E. Edge Blocks:

1. **Neoprene** with Shore A durometer hardness per manufacturer's written instructions.
2. Type recommended in writing by sealant or glass manufacturer.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch- (3-mm-) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000