

1 **ADDENDUM NO. 01**

2 ISSUE DATE: **01.21.2025**

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5 RE: **SEWELL SOCIAL SCIENCES L&S 5TH FLOOR ANTHROPOLOGY LAB RENOVATION**
6 **UNIVERSITY OF WISCONSIN - MADISON**
7 **MADISON, WISCONSIN**

8
9 UW-Madison Project No. **0046-2341** / UWSA Project No. **A-23-013**

10
11 BID OPENING: **BID OPENING for MEP BIDDERS: 2:00 P.M., January 30, 2025.**
12 **BID OPENING for GENERAL PRIME CONTRACTOR BIDDERS: 2:00 P.M., February 13, 2025.**

13
14 FROM: OPN Architects, Inc.
15 301 North Broom Street, Suite 100
16 Madison, WI 53703

17
18
19 TO: Prospective Bidders

20
21 This addendum forms a part of the Contract Documents and modifies the original Contract Documents dated **December 16,**
22 **2024** as noted below. Acknowledge receipt of this Addendum by inserting the number and issue date of this addendum in
23 the blank space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

24
25 This Addendum consists of **2 pages** and the attached documents; **Pre-Bid Meeting Agenda** (3 pages) dated 01/09/2025,
26 **Bidding RFI Log and Responses** (2 pages) dated 01/21/2025, and **2 Specification Sections**; 08 71 00 – Door Hardware
27 (14 pages) and 23 36 00 – Air Terminal Units (4 pages), both revised per Addendum 01:

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32 CHANGES TO SPECIFICATIONS (GPC BID DOCUMENTS – Volume 1 of 2):

- 33
34 1. Section **“GPC Instructions to Bidders”**, Page **B-10**, Line **6** – Revise line **6**:
35 Cylinders (**CFCI**) and cores (**OFCI**).

36
37
38 CHANGES TO SPECIFICATIONS (MEP BID DOCUMENTS – Volume 1 of 2):

- 39
40 2. Section **“MEP Instructions to Bidders”**, Page **B-9**, Line **10** – Revise line **10**:
41 Cylinders (**CFCI**) and cores (**OFCI**).

42
43
44 CHANGES TO SPECIFICATIONS (TECHNICAL SPECIFICATIONS BID DOCUMENTS – Volume 2 of 2):

- 45
46 3. Section **08 71 00 “Door Hardware”**, Replace specification section with revised section issued with this
47 Addendum with the following edits.
48 3.1 Page **8**, Lines **13-14**: Delete **“0 bitted”** and Revise Lines **13-14** to read:
49 Keyway: All cylinders and cores to be Primus **LFIC, Owner** furnished. Keying shall be performed by
50 UW Lock Shop. Installation by Contractor.
51 3.2 Page **8**, Lines **34-35**: Revise Lines **34-35** to read:
52 Locksets and latches, basis of design product per UW-Madison **building** standard: L9000-Series
53 Mortise Locksets manufactured by Schlage. Lever design: 03B. Provide basis of design product or
54 equal.
55 3.3 Page **13**, Lines **11 and 34**: Delete **“64 34 / 42”** and Revise Lines **11 and 34** to read:
56 1 **LFIC** Cylinder (size/type, as req'd) US32D SA
57 3.4 Page **14**, Line **11**: Delete **“64 34 / 42”** and Revise Line **11** to read:
58 1 **LFIC** Cylinder (size/type, as req'd) US32D SA
59 4. Section **12 35 53 “Laboratory Casework”**, Page **5**, Lines **4-6** – Add acceptable manufacturer at Line **7** to read:
60 **OnePointe Solutions (Elgin, TX)**

- 1 4. Section **23 36 00 "Air Terminal Units"**, Replace specification section with revised section issued with this
2 Addendum with the following edits.
3 4.1 Page **2**, Lines **50-52**: Added uncoated aluminum as an acceptable construction type for general
4 exhaust valve body.
5

6
7 **CHANGES TO DRAWINGS:**

- 8
9 5. Sheet A105 – FIFTH FLOOR PLAN: **REVISE** designation in Lab Equipment Schedule to read **LH-1** in lieu of **LS-4**.
10

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13
14 **END OF ADDENDUM 01**

15
16 OPN Architects, Inc.
17 301 North Broom Street, Suite 100
18 Madison, WI 53703

The Board of Regents of the
University of Wisconsin System on behalf of
the University of Wisconsin – Madison
1860 Van Hise Hall, 1220 Linden Drive
Madison Wisconsin 53707-7866

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Pre-Bid Agenda

Date: 1.9.2025 (revised 1.21.2025)
Project: Sewell Social Sciences L&S 5th Floor Anthropology Lab Renovation
Project Number: UWSA: A-23-013 / UW-Madison: 0046-2341 (OPN #23651000)
Subject: Pre-Bid Meeting

Attendees

Design Team: Robert Wheat, OPN Architects
Owner Team: Jennifer Li, UW-Madison FP&M
Bret Berglund, Indoor Air Quality Diagnostics

[Sign In Sheet](#)

Agenda

1. Introductions:

- a. OPN Architects: Robert Wheat, OPN Architects
- b. Mechanical Engineer: Jared Ramthun, Design Engineers (DE) (Not Present)
- c. Electrical Engineer: Neil Gammon, Design Engineers (DE) (Not Present)
- d. Owner Representatives: Jennifer Li, UW-Madison FP&M
Tammy Herbst-Koel, Economics - Building Manager, Sewell Social Sciences (Not Present)
- e. **Owner's Asbestos Abatement Consultant: Bret Berglund, Indoor Air Quality Diagnostics**

2. Project Description:

- a. Estimated Cost of Construction: \$835,877
- b. Architectural Description (also see invitation to bid in spec):
 - a. Interior remodeling of two labs approximately 670 GSF of existing lab space (Rooms 5415 & 5447B).
 - b. Additional remodeling of adjacent spaces required to route ductwork and above ceiling systems to the renovated (BSL-2) labs. This includes the corridor outside the renovated labs and rooms 5439 and 5477.
 - c. Includes demolition of doors and frames, some to accommodate new larger openings, removal of wall base, and both spline and ACT ceilings, as well as the removal and reconfiguration of existing mechanical, electrical, and plumbing systems in the project area, and CMU removal at existing rated shaft to accommodate new ductwork.
 - d. Owner's abatement contractor will remove / demolish existing lab casework, countertops, flooring, lighting, insulated pipe fitting materials, and above ceiling ductwork seam materials.
 - i. GPC and MEP subcontractors to coordinate closely with Owner's abatement contractor before abatement and as noted on both the abatement contractor's contract documents and the contract documents of this project. This includes providing selective enabling demolition of non-ACM building components and disconnection of utility services in project area.
 - e. New work will generally consist of patched and painted existing plus new CMU infill at shaft, patch and repair existing metal stud walls plus new infill metal stud walls, VCT flooring with resilient wall base, and new suspended ACT ceilings.
 - f. New access controlled hollow metal frames with wood doors.
 - g. There will be new painted metal laboratory casework with epoxy countertops and lab sinks.
 - h. There will be a combination of CFCI and OFCI laboratory equipment requiring utility and service connections.
 - i. Ductwork will be re-routed and above ceiling.

- c. MEPT Descriptions (additional comments from DE)
 - a. A new roof mounted centrifugal exhaust fan will be required with associated ductwork routed through an existing shaft with associated roof penetration and curbs.
 - b. Constant volume air terminals with reheat coils will be added to the existing air handling system to supply the laboratories. The existing DDC system within the building will be extended with a new supervisory controller to control the new mechanical equipment.
 - c. Electrical work will include new lighting and electrical power throughout both laboratories with replacement of panels in framed walls.
 - d. Fire alarm, telecom and access control will be extended from existing building systems to support the labs.
 - e. Project area and adjacent impacted spaces will all require new sprinklered fire protection extended from a riser located at a nearby egress stair.
- d. Any known Issues (site constraints, occupied building, etc.).
 - a. Occupied Building.
 - b. Parking (UW policy).
 - c. Material delivery and staging (coordinate dock / deliveries with Tammy Herbst-Koel).
 - d. Dumpster location (review and confirm final placement on site with UW Construction Representative).
 - e. GPC to provide minimum 4-week look ahead at each progress meeting to identify shutdowns, etc.
 - i. Impairment form in spec / available online.

3. **Project Alternates** NONE

4. **Project Unit Prices:** NONE

5. **Other associated Bids (bid or owner performed)**

- a. Asbestos Abatement work is contracted by Owner, GPC shall coordinate the work of the Asbestos Abatement Contractor (AAC) to ensure construction proceeds efficiently.
- b. Fire Extinguishers by owner.
- c. Keying of door hardware.
 - a. Cores to be OFCI (clarification to be included in first addendum)
- d. Owner Furnished / Owner Installed (reference lab equipment schedule on FIFTH FLOOR PLAN - A105).
 - a. In addition to lab equipment there are soap AND paper towel dispensers in 5415.
- e. Owner Furnished / Contractor Installed (reference lab equipment schedule on FIFTH FLOOR PLAN - A105).
 - a. In addition to lab equipment there are soap dispensers in 5447B.
- f. Class 1 Notices:
 - a. 23 09 23 - Direct Digital Control System for HVAC: (DDC control system).
 - b. 28 10 00 - Access Control System: (Access control devices).
 - c. 28 31 00 - Fire Detection and Alarm: (Fire alarm devices).

6. **Bidding Document Procurement:**

- a. <https://www.wisconsin.edu/procurement/construction/>

7. **Project Schedule**

- a. Bid Date (MEP): January 30, 2025 – 1:30pm (2pm opening)
 - a. **Opening Call-In via Zoom** (see MEP Invitation to Bid, page A-2)
- b. Bid Date (GPC): February 13, 2025 – 1:30pm (2pm opening)
 - a. **Opening Call-In via Zoom** (see GPC Invitation to Bid, page A-2)
- c. Contract: February – March 2025
- d. Mobilization & Pre-Abatement Selective Demolition: March 2025
- e. Substantial Completion: October 2025 (229 consecutive days)

8. **Bidding Requirements:**

- a. Bid Bond Required (10%)
- b. Performance Bond is required
- c. Bid Forms in Project Specification Manual
- d. This project is exempt from Wisconsin sales tax **IF** proper forms and paperwork completed with UWSA.

- e. No prevailing wage rate requirements
- f. Substitution Requests to be submitted during bidding.
 - a. Must be received in time to respond via addendum.
 - b. Last modifying addendum to be posted no later than January 23, 2025.
 - c. All contractor RFIs and substitution requests must be received by 4pm, January 16, 2025.

9. **Questions**

- a. All questions raised during this pre-bid conference should be documented in an email to rwheat@opnarchitects.com to be formally addressed via addendum. Any response provided or implied during this conference or the tour that follows is not considered binding to project unless formally included as part of a bid addendum.

10. **Walk Through**

- a. Project area / 5th Floor
 - a. Adjacent labs & impacts to occupants / experiments
 - i. Demolition, construction, and services routing
 - ii. Abatement project coordination
 - b. MEPT beyond / adjacent to project area
- b. Rooftop and access
- c. Mechanical spaces & closets beyond project area (lower floors)
 - a. Plumbing: 4th & 5th Floors
 - b. Sprinkler & Fire Panel
 - c. Chase access
- d. Site & Site Logistics
 - a. Dumpsters, staging and general contractor access
 - b. Loading dock & route to elevator

OPN Architects:

~~Attachments: Sign In Sheet~~

Distribution: To be included in Addendum (~~with sign in sheet~~)

**SEWELL SOCIAL SCIENCES L&S 5TH FLOOR ANTHROPOLOGY LAB RENOVATION
UNIVERSITY OF WISCONSIN - MADISON
MADISON, WISCONSIN**

UW-Madison Project No. **0046-2341** / UWSA Project No. **A-23-013**

Bidding RFI Log and Responses
January 21, 2025

No.	QUESTION	RESPONSE
0	Room 2315 Pictures	<p>Room 2315 (electrical closet) was not accessible during pre-bid tour. Several cell phone photos of this room may be found online at the preceding link in the Question column. These photos are meant to assist bidders but may not capture all elements and features which could factor into contractors means and methods. These files are NOT a part of the contract documents and are being provided as a matter of courtesy only, and as such, the UW System Administration, UW-Madison, and the AE (OPN Architects) is not responsible for any errors, omission, or inaccuracies that may occur or be interpreted. These images do not replace Contractor's responsibility to attend Pre-Bid Conference and perform their own due diligence in the preparation of proposals.</p>
1	<p>Confirm that plumbing service fixtures are by the lab casework contractor.</p>	<p>Correct. See specifications sections 12 35 53 (Page 7, Lines 45-56, Page 8, Lines 1-38, Page 10, Lines 26-56, and Page 11, Lines 1-33) and 22 42 00 (Page 2, Lines 7-45); faucets, drains, and strainers are furnished by GPC (by Div 12) and installed by Division 22. Bowl / sinks provided by GPC (by Div 12).</p> <p>Lab Equipment Schedule on Drawing Sheet A105 only references specification section 22 42 00 for LS-1, LS-2, LS-3, and LS-4. However, section 22 42 00 does identify the same responsibilities as described under the "Comments" column of Lab Equipment Schedule and further described in specification section 12 35 53.</p> <p>Note, designation LS-4 in Lab Equipment Schedule on Drawing Sheet A105 should be revised to read "LH-1" in lieu of "LS-4".</p>
2	<p>We would like to use metal laboratory casework manufacturers flammable and corrosive storage cabinets on this project to better coordinate with the lab casework.</p>	<p>This is acceptable provided the casework manufacturers flammable storage cabinet complies with the required approvals and compliance standards specified in section 11 53 00 including self-closing door and an equal or greater capacity. Flammable storage cabinets will also need to comply with dimensional constraints available; note cabinet depth limitations at Lab 5415 (FSC-1) due to existing column.</p> <p>Chemical / Corrosive storage cabinets are intended to be per metal laboratory casework manufacturer.</p>

3	<p>The State of WI low flow high efficiency fume hoods have sash pockets that extend to 108" off the floor. The current ceiling height is 101". Is the existing ceiling height going to remain. If so, the ceiling grid will have to be modified to allow for the upper sash enclosure. Confirm that no upper ceiling enclosure is required. This would enclose the area from the top of the fume hood to 1" below the ceiling grid.</p>	<p>Ceiling heights vary between the two lab renovations due to ducting requirements. Both labs will require ceiling pocket fabrications by acoustical ceiling installer per detail 7/A530. Finished ceiling heights are indicated on the reflected ceiling plans.</p> <p>No ceiling enclosure panel per specification section 11 53 13 (Page 9, Line 20).</p>
4	<p>According to the lab equipment schedule on sheet A105, compressed air and a cup sink are required on the left side of the fume hood. Please confirm that a cold-water fixture is also required. Also, confirm that the plaster trap below the cup sink is by the plumbing contractor.</p>	<p>A cold-water fixture is required at the left side of the fume hood (FH-2) and as scheduled as LH-1 in specification sections 22 42 00 and 12 35 53 with additional service fixture requirements specific to the fume hood in specification section 11 53 13.</p> <p>Note, designation LS-4 in Lab Equipment Schedule on Drawing Sheet A105 should be revised to read "LH-1" in lieu of "LS-4".</p>
5	<p>Please go to the American Epoxy Scientific website and "Full Sink List" for the available under counter mount epoxy sink sizes. There is an AESU-75C that is 42" wide x 20" x 10" deep with a center drain outlet. Would this sink be acceptable. If not, the manufacturer will have to construct a custom slab sink that does not pitch to the center drain. They make the sink be gluing slabs of epoxy together.</p>	<p>Lab sink (LS-3) will need to be a custom fabrication if standard size and configuration unavailable. The provided dimensions with 3 faucets and dual outlets are per Principal Investigator requirements.</p> <p>See the following link LS-3 Comp for photos of comparable sink at PI's previous institution for reference. Design intent is to emulate this sink. These photos are meant to assist bidders but may not capture all elements and features which could factor into contractors means and methods. These files are NOT a part of the contract documents and are being provided as a matter of courtesy only, and as such, the UW System Administration, UW-Madison, and the AE (OPN Architects) is not responsible for any errors, omission, or inaccuracies that may occur or be interpreted. These images do not replace Contractor's responsibility to attend Pre-Bid Conference and perform their own due diligence in the preparation of proposals.</p>

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**SECTION 08 71 00
DOOR HARDWARE**

PART 1 GENERAL

SCOPE

The work under this section includes all labor, material, equipment and related services necessary for the installation of door finish hardware. Section includes commercial door hardware for swinging doors. Door hardware includes, but is not necessarily limited to, the following:

- Mechanical door hardware.
- Electromechanical door hardware.
- Cylinders specified for doors in other sections.

PART 1 – GENERAL

- Scope
- Related Work
- Reference Standards
- Submittals
- Quality Assurance
- Delivery, Storage and Handling
- Coordination
- Warranty

PART 2 – PRODUCTS

- Butt Hinges
- Power Transfer Devices
- Door Operating Trim
- Cylinders and Keying
- Mortise Locks and Latching Devices
- Lock and Latch Strikes
- Surface Door Closers
- Door Stops and Holders
- Architectural Seals
- Electronic Accessories
- Fabrication
- Finishes

PART 3 – EXECUTION

- Examination
- Preparation
- Installation
- Field Quality Control
- Adjusting
- Cleaning and Protection
- Demonstration
- Door Hardware Sets

RELATED WORK

Applicable provisions of the Conditions of the Contract and Division 1 govern work under this Section .

- 06 10 00 – Rough Carpentry
- 08 12 13 – Hollow Metal Frames
- 08 14 16 – Flush Wood Doors
- Division 26

1 **REFERENCE STANDARDS**

2 Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

3 ANSI A117.1 - Accessible and Usable Buildings and Facilities.

4 ICC/IBC - International Building Code.

5 NFPA 70 - National Electrical Code.

6 NFPA 80 - Fire Doors and Windows.

7 NFPA 101 - Life Safety Code.

8 NFPA 105 - Installation of Smoke Door Assemblies.

9
10 Standards: All hardware specified herein shall comply with the following industry standards as applicable.

11 Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

12 ANSI/BHMA Certified Product Standards - A156 Series.

13 UL10C - Positive Pressure Fire Tests of Door Assemblies.

14 ANSI/UL 294 - Access Control System Units.

15 UL 305 - Panic Hardware.

16 ANSI/UL 437- Key Locks.

17
18 **SUBMITTALS**

19 Product Data: Manufacturer's product data sheets including installation details, material descriptions,
20 dimensions of individual components and profiles, operational descriptions and finishes.

21
22 Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and
23 assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware
24 Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish
25 of door hardware.

26 Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for
27 the Hardware Schedule."

28
29 Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete
30 designations of every item required for each door or opening. Organize door hardware sets in same
31 order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format
32 and order as the Door Hardware Sets will be rejected and subject to resubmission.

33
34 Content: Include the following information:

35 Type, style, function, size, label, hand, and finish of each door hardware item.

36
37 Manufacturer of each item.

38
39 Fastenings and other pertinent information.

40
41 Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and
42 frame schedule.

43
44 Explanation of abbreviations, symbols, and codes contained in schedule.

45
46 Mounting locations for door hardware.

47
48 Door and frame sizes and materials.

49
50 Warranty information for each product.

51
52 Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly
53 where approval of the Door Hardware Schedule must precede fabrication of other work that is critical
54 in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work

1 affected by door hardware, and other information essential to the coordinated review of the Door
2 Hardware Schedule.

3
4 Shop Drawings: Details of electrified access control hardware indicating the following:

5 Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for
6 power, signaling, monitoring, communication, and control of the access control system electrified
7 hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the
8 following:

9 Elevation diagram of each unique access controlled opening showing location and interconnection
10 of major system components with respect to their placement in the respective door openings.

11
12 Complete (risers, point-to-point) access control system block wiring diagrams.

13
14 Wiring instructions for each electronic component scheduled herein.

15
16 Electrical Coordination: Coordinate with related sections the voltages and wiring details required at
17 electrically controlled and operated hardware openings.

18
19 Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying
20 schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying
21 system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner
22 must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

23
24 Informational Submittals:

25 Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of
26 comprehensive tests performed by manufacturer and witnessed by a qualified independent testing
27 agency.

28
29 Closeout Submittals:

30 Operating and Maintenance Manuals: Prior to final payment, provide manufacturers operating and
31 maintenance manuals for each item comprising the complete door hardware installation in quantity as
32 required in Division 01.

33
34 Project Record Documents: Provide record documentation of as-built door hardware sets in digital
35 format (.pdf, .docx, .xlsx, .csv) and as required in Division 01. All openings shall be listed to reflect
36 final installed configuration only.

37 38 **QUALITY ASSURANCE**

39 It is the intent of this specification that the hardware supplier provide a complete set of hardware for each
40 door, including attachment devices, adaptors and accessories required for proper function. Items of
41 hardware not definitely specified herein but necessary for completion of the work shall be provided. Such
42 items shall be of type and quality suitable to the service required and comparable to the adjacent hardware.
43 Where size and shape of members is such as to prevent the use of types specified, hardware shall be
44 furnished of suitable types having as nearly as practicable the same operation and quality as the type
45 specified. Sizes shall be adequate for the service required. Include such nuances as strike type, strike lip
46 length, raised barrel hinges, mounting brackets, blade stop spacers, special templates, fasteners, shims, and
47 coordination between conflicting products. All doors shall be provided with a stop.

48
49 Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies
50 complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection
51 ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise
52 indicated. Provide positive latching and self closing, regardless if specified in sets.

53

1 The hardware supplier shall assist the Contractor with the coordination and adjustment of finished
2 hardware.

3
4 Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented
5 experience in producing hardware and equipment similar to that indicated for this Project and that have a
6 proven record of successful in-service performance.

7
8 Certified Products: Where specified, products must maintain a current listing in the Builders Hardware
9 Manufacturers Association (BHMA) Certified Products Directory (CPD).

10
11 Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified
12 door hardware similar in material, design, and extent to that indicated for this Project and whose work has
13 resulted in construction with a record of successful in-service performance.

14
15 Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a
16 minimum 5 years documented experience supplying both mechanical and electromechanical hardware
17 installations comparable in material, design, and extent to that indicated for this Project. Supplier
18 recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing
19 facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC)
20 available during the course of the Work to consult with Contractor, Architect, and Owner concerning both
21 standard and electromechanical door hardware and keying.

22
23 Source Limitations: Obtain each type and variety of door hardware specified in this section from a single
24 source unless otherwise indicated.

25 Electrified modifications or enhancements made to a source manufacturer's product line by a
26 secondary or third party source will not be accepted.

27
28 Provide electromechanical door hardware from the same manufacturer as mechanical door hardware,
29 unless otherwise indicated.

30
31 Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

32
33 Keying Conference: Conduct conference to comply with requirements in Division 01. Keying conference
34 to incorporate the following criteria into the final keying schedule document:

35 Function of building, purpose of each area and degree of security required.

36
37 Plans for existing and future key system expansion.

38
39 Requirements for key control storage and software.

40
41 Installation of permanent keys, cylinder cores and software.

42
43 Address and requirements for delivery of keys.

44
45 Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division
46 01 with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper
47 methods and the procedures for receiving, handling, and installing door hardware.

48 Prior to installation of door hardware, conduct a project specific training meeting to instruct the
49 installing contractors' personnel on the proper installation and adjustment of their respective products.
50 Product training to be attended by installers of door hardware (including electromechanical hardware)
51 for aluminum, hollow metal and wood doors. Training will include the use of installation manuals,
52 hardware schedules, templates and physical product samples as required.

1 Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work
2 performed by other trades.

3
4 Review sequence of operation narratives for each unique access controlled opening.

5
6 Review and finalize construction schedule and verify availability of materials.

7
8 Review the required inspecting, testing, commissioning, and demonstration procedures
9

10 At completion of installation, provide written documentation that components were applied according to
11 manufacturer's instructions and recommendations and according to approved schedule.
12

13 **DELIVERY, HANDLING AND STORAGE**

14 Hardware shall be delivered to the Contractor at the job site completely packaged with all necessary
15 screws, bolts, miscellaneous parts, instructions and installation templates. Each package shall be legibly
16 and properly labeled, corresponding to the approved hardware schedule.
17

18 All hardware shall be stored in a dry, secure area, in a manner to facilitate sorting, checking and unpacking.
19

20 Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to
21 Project site. Do not store electronic access control hardware, software or accessories at Project site without
22 prior authorization.
23

24 Tag each item or package separately with identification related to the final Door Hardware Schedule, and
25 include basic installation instructions with each item or package.
26

27 Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related
28 accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to
29 the Owner shall be established at the "Keying Conference".
30

31 **COORDINATION**

32 Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work
33 specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of
34 other work to confirm that adequate provisions are made for locating and installing hardware to comply
35 with indicated requirements.
36

37 Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified
38 door hardware and related access control equipment with required connections to source power junction
39 boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm
40 systems.
41

42 Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired
43 (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access
44 control system hardware without additional in-field modifications.
45

46 **WARRANTY**

47 General Warranty: Applicable provisions of the Conditions of the Contract and Division 01. Special
48 warranties specified in this Article shall not deprive Owner of other rights Owner may have under other
49 provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties
50 made by Contractor under requirements of the Contract Documents.
51

52 Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components
53 of standard and electrified door hardware that fails in materials or workmanship within specified warranty
54 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
3 Faulty operation of the hardware.

4
5 Deterioration of metals, metal finishes, and other materials beyond normal weathering.

6
7 Electrical component defects and failures within the systems operation.

8
9 Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial
10 Completion.

11
12 All work in this Section shall be guaranteed to be free from defects in materials and workmanship for a
13 period of one (1) year from date of Substantial Completion of the Project. In addition, provide factory
14 warranty for locks closers and exit devices specific for this project. Factory direct order number shall be
15 provided for each shipment of locks, closers and exit devices with warranty, prior to final payment.

16
17
18 **PART 2 PRODUCTS**

19
20 Where specific products are named, products by other manufacturers may be considered equal in
21 accordance with the provisions of Article 3.4.2 of the General Conditions of the Contract for Construction
22 (AIA Document A201 as modified by UWSA).

23
24
25 **BUTT HINGES**

26 Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in
27 the Door Hardware Sets.

28
29 Quantity: Provide the following hinge quantity:

30 Two Hinges: For doors with heights up to 60 inches.

31 Three Hinges: For doors with heights 61 to 90 inches.

32 Four Hinges: For doors with heights 91 to 120 inches.

33
34 For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of
35 door height greater than 120 inches.

36
37 Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door
38 thickness and clearances required:

39 Widths up to 3'0": 4-1/2" standard or heavy weight as specified.

40 Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

41
42 Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

43 Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless
44 Hardware Sets indicate standard weight.

45 Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless
46 Hardware Sets indicate heavy weight.

47
48 Hinge Options: Comply with the following:

49 Non-removable Pins: With the exception of electric through wire hinges, provide set screw in
50 hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is
51 closed; for all out-swinging lockable doors.
52
53
54

1 Manufacturers:
2 Hager Hinge Company
3 Ives (IV) - 5BB Series, 5-knuckle.
4 McKinney (MK) - TA/T4A Series, 5-knuckle.
5

6 **POWER TRANSFER DEVICES**

7 Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised
8 into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug
9 connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions
10 specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for
11 connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
12

13 Manufacturers:
14 Securitron (SU) - EL-CEPT Series.
15 Von Duprin (VD) - EPT-10 Series.
16

17 Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug
18 connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring
19 harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type
20 of concealed wires to accommodate electric function of specified hardware. Provide a connector for
21 through-door electronic locking devices and from hinge to junction box above the opening. Wire nut
22 connections are not acceptable. Determine the length required for each electrified hardware component for
23 the door type, size and construction, minimum of two per electrified opening.
24

25 Provide one each of the following tools as part of the base bid contract:
26 McKinney (MK) - Electrical Connecting Kit: QC-R001.
27 McKinney (MK) - Connector Hand Tool: QC-R003.
28

29 Manufacturers:
30 McKinney (MK) - QC-C Series.
31 Von Duprin (VD) - Connect.
32

33 **DOOR OPERATING TRIM**

34 Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16,
35 Grade 1.

36 Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location
37 approximately six feet from the floor.
38

39 Furnish dust proof strikes for bottom bolts.
40

41 Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for
42 windstorm components where applicable.
43

44 Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate
45 installation and operation.
46

47 Manufacturers:
48 Ives (IV).
49 Rockwood (RO).
50

51 **CYLINDERS AND KEYING**

52 General: Cylinder manufacturer to have minimum (10) years experience designing secured master key
53 systems and have on record a published security keying system policy.
54

1 Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
2 Threaded mortise cylinders with rings and cams to suit hardware application.

3
4 Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

5
6 Bored or cylindrical lock cylinders with tailpieces as required to suit locks.

7
8 Tubular deadlocks and other auxiliary locks.

9
10 Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be
11 free spinning with matching finishes.

12
13 Keyway: All cylinders and cores to be Primus LFIC, ~~Contractor~~ Owner furnished, ~~0-bitted~~. Keying
14 shall be performed by UW Lock Shop. Installation by Contractor.

15
16 Construction Keying: Provide construction cores, keyed alike.

17 **MORTISE LOCKS AND LATCHING DEVICES**

18 Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade
19 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions
20 and features as specified herein.

21
22
23 Electromechanical locksets shall have the following functions and features:

24 Universal Molex plug-in connectors that have standardized color-coded wiring and are available in
25 fail safe or fail secure and operate from 12vdc to 24vdc regulated.

26
27 EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by
28 GreenCircle.

29
30 Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.

31
32 Two-year limited warranty on electrified functions.

33
34 Locksets and latches, basis of design product per UW-Madison building standard: L9000-Series
35 Mortise Locksets manufactured by Schlage. Lever design: 03B. Provide basis of design product or
36 equal.

37
38 Manufacturers:

39 Sargent Manufacturing (SA) - 8200 Series.

40 Schlage (SC) - L9000 Series.

41 **LOCK AND LATCH STRIKES**

42
43 Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip
44 extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

45 Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

46
47 Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

48
49 Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum
50 framing.

51
52 Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue
53 hardware applications.

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Standards: Comply with the following:

- Strikes for Mortise Locks and Latches: BHMA A156.13.
- Strikes for Bored Locks and Latches: BHMA A156.2.
- Strikes for Auxiliary Deadlocks: BHMA A156.36.
- Dustproof Strikes: BHMA A156.16.

SURFACE DOOR CLOSERS

All door closers specified herein shall meet or exceed the following criteria:

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.

Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

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 Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

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.

Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed 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.

Large body cast iron surface mounted door closers shall have a 30-year warranty.

Closers basis of design product per UW-Madison standard: Model 4040XP closers manufactured by LCN. Provide basis of design product or equal.

Manufacturers:

- LCN Closers (LC) - 4040XP Series.
- Sargent Manufacturing (SA) - 281 Series.

DOOR STOPS AND HOLDERS

General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 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:
2 Ives (IV).
3 Rockwood (RO).
4

5 **ARCHITECTURAL SEALS**

6 General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in
7 the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light,
8 or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive
9 fasteners and elsewhere where indicated.

10
11 Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing
12 and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated,
13 based on testing according to UL 1784.

14 Provide smoke labeled perimeter gasketing at all smoke labeled openings.

15
16 Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and
17 inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing
18 according to UL-10C.

19 Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of
20 Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

21
22 Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for
23 sound ratings indicated.

24
25 Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily
26 replaceable and readily available from stocks maintained by manufacturer.

27
28 Manufacturers:
29 National Guard Products (NG).
30 Pemko (PE).
31 Reese Enterprises, Inc. (RE).
32

33 **ELECTRONIC ACCESSORIES**

34 Door Position Switches: Door position magnetic reed contact switches specifically designed for use in
35 commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1"
36 diameter hole. Surface mounted models include wide gap distance design complete with armored flex
37 cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with
38 flush top channels.

39
40 Manufacturers:
41 Securitron (SU) - DPS Series.
42

43 **FABRICATION**

44 Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for
45 machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation
46 standards for application intended.

47 48 **FINISHES**

49 Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying
50 with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain
51 manufacturers for their products.

52
53 Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and
54 other qualities complying with manufacturer's standards, but in no case less than specified by referenced
55 standards for the applicable units of hardware.

1
2 Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary
3 protective covering before shipping.
4

5 6 **PART 3 EXECUTION**

7 8 **EXAMINATION**

9 Examine scheduled openings, with Installer present, for compliance with requirements for installation
10 tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions
11 affecting performance.
12

13 Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and
14 scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.
15

16 **PREPARATION**

17 Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
18

19 Wood Doors: Comply with ANSI/DHI A115-W series.
20

21 **INSTALLATION**

22 Install each item of mechanical and electromechanical hardware and access control equipment to comply
23 with manufacturer's written instructions and according to specifications.

24 Installers are to be trained and certified by the manufacturer on the proper installation and adjustment
25 of fire, life safety, and security products including: hanging devices; locking devices; closing devices;
26 and seals.
27

28 Mounting Heights: Mount door hardware units at heights indicated in following applicable publications,
29 unless specifically indicated or required to comply with governing regulations:

30 Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for
31 Standard Steel Doors and Frames."
32

33 DHI TDH-007-20: Installation Guide for Doors and Hardware.
34

35 Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility
36 Guidelines for Buildings and Facilities."
37

38 Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
39

40 Retrofitting: Install door hardware to comply with manufacturer's published templates and written
41 instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are
42 later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface
43 protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted
44 items until finishes have been completed on substrates involved.
45

46 Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate,
47 countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
48

49 Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with
50 requirements specified in Division 7 Section "Joint Sealants."
51

52 Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the
53 handling and installation of hardware items so that the completion of the work will not be delayed by
54 hardware losses before and after installation.

1
2 **FIELD QUALITY CONTROL**

3 Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project
4 punch report for each installed door opening indicating compliance with approved submittals and
5 verification hardware is properly installed, operating and adjusted. Include list of items to be completed and
6 corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

7 Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists
8 organized by Mark, Opening Remarks and Comments, and related Opening Images and Video
9 Recordings.

10
11 **ADJUSTING**

12 Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper
13 operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust
14 door control devices to compensate for final operation of heating and ventilating equipment and to comply
15 with referenced accessibility requirements.

16
17 **CLEANING AND PROTECTION**

18 Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware
19 installed on doors during the construction phase. Install any and all hardware at the latest possible time
20 frame.

21
22 Clean adjacent surfaces soiled by door hardware installation.

23
24 Clean operating items as necessary to restore proper finish. Provide final protection and maintain
25 conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

26
27 **DEMONSTRATION**

28 Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical
29 door hardware.

30
31 **DOOR HARDWARE SETS**

32 The hardware sets represent the design intent and direction of the owner and architect. They are a guideline
33 only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and
34 missing items should be brought to the attention of the architect with corrections made prior to the bidding
35 process. Omitted items not included in a hardware set should be scheduled with the appropriate additional
36 hardware required for proper application and functionality.

37
38 Quantities listed are for each pair of doors, or for each single door.

39
40 The supplier is responsible for handling and sizing all products.

41
42 Where multiple options for a piece of hardware are given in a single line item, the supplier shall
43 provide the appropriate application for the opening.

44
45 At existing openings with new hardware the supplier shall field inspect existing conditions prior to
46 the submittal stage to verify the specified hardware will work as required. Provide alternate solutions
47 and proposals as needed.

48
49 **Manufacturer's Abbreviations:**

- 50 1. MK - McKinney
51 2. SU - Securitron
52 3. RO - Rockwood
53 4. SA - SARGENT
54 5. PE - Pemko

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Hardware Sets

Set: 1.0

Doors: 5415-1

Description: Card Reader x Electrified Lock, Closer/Stop/Track(Pull Side), Rated

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Electric Power Transfer	EL-CEPT	613E	SU
1 Electrified Lock (Fail Sec, RX)	LC RX 8271 LE1J	US26D	SA
1 LFIC Cylinder	64-34-42 (size/type, as req'd)	US32D	SA
1 IC Core	LFIC x UW Lockshop Req'd Standard		
1 Closer - Slide Track/Stop	281 OTB	EN	SA
1 Perimeter Gasketing	S88BL (head & jambs)		PE
1 E-Lynx Harness (Frame)	QC-C3000P		MK
1 E-Lynx Harness (Door)	QC-C*** (length / type as req'd)		MK
1 Card Reader	By Div. 28		
1 Door Position Switch	By Div. 28		SU

Notes:

- Door normally closed and locked.
- Valid card read unlocks lever for entry. Entry by key available.
- DPS indicates door status.
- Request to exit in inside lever signals valid egress.
- Free egress at all times.

Set: 2.0

Doors: 5447B-2

Description: Card Reader x Electrified Lock, Closer/Stop, Rated

3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
1 Electric Power Transfer	EL-CEPT	613E	SU
1 Electrified Lock (Fail Sec, RX)	LC RX 8271 LE1J	US26D	SA
1 LFIC Cylinder	64-34-42 (size/type, as req'd)	US32D	SA
1 IC Core	LFIC x UW Lockshop Req'd Standard		
1 Closer - PA /Stop	281 PS	EN	SA
1 Perimeter Gasketing	S88BL (head & jambs)		PE
1 E-Lynx Harness (Frame)	QC-C3000P		MK
1 E-Lynx Harness (Door)	QC-C*** (length / type as req'd)		MK
1 Card Reader	By Div. 28		
1 Door Position Switch	By Div. 28		SU

Notes:

- Door normally closed and locked.
- Valid card read unlocks lever for entry. Entry by key available.
- DPS indicates door status.
- Request to exit in inside lever signals valid egress.
- Free egress at all times.

1	Set: 3.0			
2	Doors: 5447B-1			
3	Description: Card Reader x Electrified Lock, Closer/Stop/Track(Pull Side), Narrow Inactive, Pair, Rated			
4				
5	1 Hinge	TA2714 (NRP)	US26D	MK
6	3 Hinge (heavy weight)	T4A3786 (NRP)	US26D	MK
7	2 Hinge, Spring	1502 4-1/2" x 4-1/2"	US26D	MK
8	1 C/L Flush Bolt Set	2845/2945 (as req'd)	US26D	RO
9	1 Dust Proof Strike	570	US26D	RO
10	1 Electrified Lock (Fail Sec, RX)	LC RX 8271 LE1J	US26D	SA
11	1 LFIC Cylinder	64-34-42 (size/type, as req'd)	US32D	SA
12	1 IC Core	LFIC x UW Lockshop Req'd Standard		
13	1 Closer - Slide Track/Stop	281 OTB	EN	SA
14	1 Wall Stop	402 / 405 (as req'd)	US26D	RO
15	1 Astragal Edge Seal	S772BL x Dr Ht		PE
16	1 Perimeter Gasketing	S88BL (head & jambs)		PE
17	1 Card Reader	By Div. 28		
18	1 Door Position Switch	By Div. 28		SU
19				

20 Notes:
21 Spring hinges and wall stop for narrow, inactive leaf.
22
23 Door normally closed and locked.
24 Valid card read unlocks lever for entry. Entry by key available.
25 DPS indicates door status.
26 Request to exit in inside lever signals valid egress.
27 Free egress at all times.

28
29 **END OF SECTION**

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SECTION 23 36 00
AIR TERMINAL UNITS
BASED ON DFD MASTER SPECIFICATION DATED 7/11/2023

PART 1 - GENERAL

SCOPE

This section includes specifications for air terminal equipment. Included are the following topics:

PART 1 - GENERAL

- Scope
- Related Work
- Reference
- Reference Standards
- Quality Assurance
- Shop Drawings
- Operation and Maintenance Data
- Design Criteria

PART 2 - PRODUCTS

- Supply Air Terminal Boxes
- Venturi Air Valves
- Terminal Air Box/Venturi Air Valve Controls
- Access Doors
- Insulation
- Control Enclosures

PART 3 - EXECUTION

- Installation
- Access Doors
- Insulation
- Labeling
- Adjusting
- Construction Verification
- Functional Performance Testing
- Agency Training

RELATED WORK

- Section 01 91 01 – Commissioning Process
- Section 23 08 00 – Commissioning of HVAC
- Section 23 09 14 - Pneumatic and Electric Instrumentation and Control Devices for HVAC
- Section 23 09 93 – Sequence of Operation for HVAC Controls
- Section 23 31 00 - HVAC Ducts and Casings
- Section 23 33 00 - Air Duct Accessories
- Section 23 82 00 - Convection Heating and Cooling Units

REFERENCE

Applicable provisions of Division 1 govern work under this section.

REFERENCE STANDARDS

- NFPA 90A - Installation of Air Conditioning and Ventilation Systems.
- UL 181 - Factory-Made Air Ducts and Connectors.
- ARI-ADC Standard 880
- ASTM E84 – Surface Burning Characteristics of Building Materials
- UL 723 – Surface Burning Characteristics of Building Materials

QUALITY ASSURANCE

Refer to Division 1, General Conditions, Equals and Substitutions.

SHOP DRAWINGS

Refer to Division 1, General Conditions, Submittals.

Contractor shall submit air terminal unit data including materials of construction, dimensions, scheduled flow rates, pressure drops, radiated and discharge sound power levels, reset volume controller data, actuator spring range and torque data.

1 **OPERATION AND MAINTENANCE DATA**

2 All operations and maintenance data shall comply with the submission and content requirements specified
3 under section GENERAL REQUIREMENTS.

4
5 **DESIGN CRITERIA**

6 Select sizes, capacities, configuration, and operating characteristics as shown on the plans and/or as
7 scheduled.

8
9
10 **PART 2 - PRODUCTS**

11
12 **SUPPLY AIR TERMINAL BOXES**

13 Units shall be single duct and pressure independent.

14
15 **MANUFACTURERS:**

16 Carnes, Envirotec, Greenheck, Metal-Aire, Nailor, Price, Titus, Trane, or equal.

17
18 **CONSTRUCTION:**

19 Unit casing shall be minimum 22 gauge steel and internally insulated with 13/16" rigid fiberglass insulation
20 with a foil scrim face or 3/4" thick polyolefin closed cell insulation. Construction to meet UL 181 and NFPA
21 90A. Casing shall be sealed to limit leakage to a maximum of 15 cfm at 6.0 inches of static pressure. Casing
22 outlet shall have slip and drive joint for connection to discharge ductwork.

23
24 Metal damper blade shall be mounted to shaft having self-lubricated bearings. Shaft end shall be marked to
25 indicate damper position and shall have a built-in stop to prevent overstroking. Damper blade shall close off
26 against gasket to limit leakage to 10 cfm at 6.0 inches of differential static pressure. Damper linkage shall
27 be sized to accept at least 40 inch-pounds of torque to the damper shaft. Damper shaft shall be provided with
28 a marking indicating damper position.

29
30 Round inlet collar shall be equipped with a multi-point flow sensor that shall amplify the measured velocity
31 pressure. Pneumatic tubing from flow sensor to differential pressure transducer shall be UL listed, fire
32 retardant (FR) type.

33
34 **HOT WATER REHEAT COIL:**

35 Reference section 23 82 00 for hot water reheat coil specifications.

36
37 For hot water coils factory mounted, provide a 12" to 18" casing extension, complete with access panel as
38 specified below between the manufacturer's standard casing termination and the hot water reheat coil.

39
40 **VENTURI AIR VALVES**

41 Factory calibrated, pressure independent venture type valve for variable volume applications.

42
43 **MANUFACTURERS:**

44 Phoenix Corp., Price Critical Controls, Rosemax, Siemens – Landis, TSI, or equal

45
46 **GENERAL LAB AND FUME EXHAUST CONSTRUCTION**

47 Valve body and cone shall be 16 gauge, 316 stainless steel. Valve body ends shall have slip connections.
48 Control valve shall be mounted to a 316 stainless steel shaft on Teflon bearings. The pressure independent
49 spring shall be stainless steel. The shaft support brackets, pivot arm, internal mounting link, nuts, bolts, and
50 rivets shall be constructed from 316 stainless steel. As an option, fume exhaust valve body may be
51 constructed from 16 gauge spun aluminum and be completely coated with factory applied baked Heresite.
52 General exhaust valve body may be 16 gauge uncoated spun aluminum.

53
54 **PEFORMANCE:**

55 Valve shall be pressure independent without means of external control devices. Calibrated spring shall
56 maintain a cfm setting within +/- 5% over a calibrated range of 0.3 – 3.0 inches w.c. duct pressure range.
57 Valve shall be capable of 16:1 turndown ratio. Valve shall be capable of 100% shutoff where noted on the
58 drawings.

59
60 **TERMINAL AIR BOX/VENTURI AIR VALVE CONTROLS**

61 **DDC CONTROLS:**

62 **BUTTERFLY DAMPER TERMINAL AIR BOX**

63 Damper actuator and differential pressure sensor for flow measurement shall be provided with the DDC
64 controller provided for the terminal air box as specified under Section 23 09 23.

1 VENTURI AIR VALVE

2 Fume Hood Actuation (High Speed): Provide a damper actuator and all required linkages provided and
3 mounted by the manufacturer. Actuator shall be high speed with a maximum of a 2.5 second response time
4 for a 90° rotation. Size operators for smooth and positive operation of devices served, and with sufficient
5 torque capacity to provide tight shutoff against system temperatures and pressure encountered. All electric
6 actuators will be provided with overload protection to prevent motor from damage when stall condition is
7 encountered. Actuator shall use 24VAC power.
8

9 For modulating applications, signal input to the actuator shall be 0-10VDC, 2-10VDC, or 4-20mA to match
10 requirements of the DDC controller. Provide a factory mounted feedback device that measures the valve
11 position and provides an electronic signal that is linear to the flow of the valve. The actuator shall be directly
12 controlled by the DDC controller provided under Section 23 09 23.
13

14 **ACCESS DOORS**

15 **STANDARD ACCESS DOORS:**

16 Access door to be designed and constructed for the pressure class of the duct in which the door is to be
17 installed. Doors in exposed areas shall be hinged type with cam sash lock not requiring a tool for opening
18 and closing. Hinges shall be steel full length continuous piano type. Doors in concealed spaces may be
19 secured in place with cam sash latches. For both hinged and non hinged doors provide sufficient number of
20 camp sash latches to provide air tight seal when door is closed. Do not use hinged doors in concealed spaces
21 if this will restrict access. Use minimum 1" deep 24 gauge galvanized steel double wall access doors with
22 minimum 24 gauge galvanized steel frames. For non-galvanized ductwork, use minimum 1" deep double
23 wall access door with frame that shall use materials of construction identical to adjacent ductwork. Provide
24 double neoprene gasket that shall provide seals from the frame to the door and frame to the duct. When
25 access doors are installed in insulated ductwork or equipment provide insulated doors with insulation
26 equivalent to what is provided for adjacent ductwork or equipment. Access doors constructed with sheet
27 metal screw fasteners or requiring a tool or object for access will not be accepted. Minimum access door size
28 shall be 9" x 9".
29

30 **ROUND DUCT ACCESS DOORS:**

31 For duct pressure class positive or negative up to 6 in. wg. Access doors shall be constructed from 16 gauge
32 stainless steel for fume exhaust ducts and 16 gauge galvanized steel for general exhaust or return ducts.
33 Hinges shall be continuous piano style constructed from the same material as the access door. Access doors
34 shall be sealed with ¼" closed cell butyl gasketing permanently bonded on all four sides and no fewer than
35 two draw latches with strike plates. The strike plates shall match the duct/access door material.
36

37 **INSULATION**

38 Materials or accessories containing asbestos will not be accepted.
39

40 Use composite insulation systems (insulation, jackets, sealants, and adhesives) that have a flame spread rating
41 of 25 or less and smoke developed rating of 50 or less.
42

43 **RIGID FIBERGLASS INSULATION:**

44 Minimum nominal density of 3 lbs. per cu. ft., and thermal conductivity of not more than 0.23 at 75 degrees
45 F, minimum compressive strength of 25 PSF at 10% deformation, rated for service to 450 degrees F.
46

47 Foil-scrim-kraft vapor barrier jacket, factory applied to insulation, maximum permeance of .02 perms. All
48 exposed insulation edges shall be covered with metal nosing.
49

50 **CONTROL ENCLOSURES**

51 Do not provide a controls enclosure for air terminal units installed above accessible lay-in tile ceilings.
52
53

54 **PART 3 - EXECUTION**

55 **INSTALLATION**

56 Install air terminal units as indicated on project drawings and in accordance with the manufacturer's
57 installation instructions.
58

59 Mount air terminal boxes with a minimum 3 feet of straight ductwork upstream of inlet flow sensor for sizes
60 12" diameter and below. Provide a minimum of 3X the inlet diameter of straight duct upstream of the inlet
61 flow sensor for inlet sizes above 12" diameter.
62

1 Where hot water reheat coils are provided with air terminal boxes the following two options may be used.
2 Field mount coil separate from box with a 12-18" section of duct between the air terminal box and reheat
3 coil. The reheat coil and 12-18" section of duct shall be wrapped with external insulation as indicated in
4 specification section 23 07 00 – HVAC Insulation.

5
6 Factory mount coil in extended supply air terminal unit. The supply air terminal unit shall be extended at the
7 factory 12-18" and internally insulated to match the insulation used for the supply air terminal unit

8
9 Provide a minimum of 36" of clearance on the controller side of the air terminal unit in front of the controller.
10 The minimum clearance area shall extend 30" wide.

11
12 Provide 24" of clearance in front of all access doors.

13
14 Support air terminal units from building structure using sheet metal straps or trapeze hanger with rods. Do
15 not mount air terminal units off adjacent ductwork or piping.

16 17 **ACCESS DOORS**

18 **DUCT ACCESS DOORS – SQUARE DUCT:**

19 Provide duct access doors in duct or extended supply air terminal unit upstream and downstream of the reheat
20 coil. Duct access doors shall be as large as duct allows with a maximum size of 18"x18". Install heating
21 coils in accordance with Section 23 73 12 - Air Handling Unit Coils.

22 23 **DUCT ACCESS DOORS – ROUND DUCT:**

24 Install round duct access doors on the side of the duct upstream of the return/exhaust terminal unit. At no
25 time shall the access door be installed in the bottom of the duct. Piano hinged style access doors shall be
26 installed with the piano hinges located ½ above the bottom of the duct to allow the access door to swing
27 down toward the floor.

28 29 **INSULATION**

30 **RIGID FIBERGLASS INSULATION:**

31 All rigid duct insulation edges shall be covered with metal nosing. Foil scrim face must completely separate
32 the rigid fiberglass duct material from the air stream.

33
34 For supply air terminal units, provide five feet of 1" thick lining immediately downstream from air terminal
35 unit discharge. Where hot water reheat coils are field or factory installed, provide five feet of 1" thick lining
36 in ductwork immediately downstream of reheat coil. Refer to specification section 23 33 00 – Air Duct
37 Accessories for liner specification.

38 39 **LABELING**

40 For terminal units and venturi air valves above accessible ceilings, that is accessed above acoustical lay in
41 ceilings or access doors, label the ceiling tile grid at the ceiling tile that is to be removed for access to the
42 terminal unit or the access door. The label shall be pre-printed using clear polyester tape with black bold 28
43 size font for ceilings under 12 feet. For accessible ceilings, use an arrow to point at ceiling tile to be removed
44 for access. Label shall match terminal unit and venturi air valve tag designation used on mechanical plans.

45 46 **ADJUSTING**

47 Coordinate adjustment of air terminal units with section 23 05 93 - Testing, Adjusting and Balancing.

48 49 **CONSTRUCTION VERIFICATION**

50 Contractor is responsible for utilizing the construction verification checklists supplied under specification
51 Section 23 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01.

52 53 **FUNCTIONAL PERFORMANCE TESTING**

54 Contractor is responsible for utilizing the functional performance test forms supplied under specification
55 Section 23 08 00 in accordance with the procedures defined for functional performance testing in Section 01
56 91 01.

57 58 **AGENCY TRAINING**

59 All training provided for agency shall comply with the format, general content requirements and submission
60 guidelines specified under Section 01 91 01.

61
62 **END OF SECTION**