

**Addendum No. 2**

September 19, 2018

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James T. Vaughn Correctional Center

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Project Name: **JT VAUGHN CORRECTIONAL CENTER BUILDING 20 Expansion**
Bid Package "B"

OMB/DFM/DOC Contract No: MJ3804000097

NOTICE: Attach this addendum to the Project Manual for this project. It modifies and becomes a part of the Bidding and Contract Documents dated August 30, 2018. Work for materials not specifically mentioned herein are to be as described in the main body of the specifications and as shown on the Drawings. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

The bidding and contract documents for the above referenced project are amended as follows:

GENERAL CLARIFICATIONS:

1. Section 07 52 16 SBS Modified Bituminous Membrane Roofing: "Soprema" has a roofing system that meets or exceeds the specifications and will be considered an equal for bidding Bid Package B.
2. All contracts in Bid Package B: Each contract shall provide a 10lb fire extinguisher (Multi-Purpose ABC dry chemical, UL labeled, rated 3a:40bc) which shall be on site any time you or your subcontractors are working on the project. Extinguishers shall be removed each day just like other equipment.
3. Contract JTVCC-006 Carpentry & General Trades: All work associated with purchasing and installing all door frames, doors, and hardware for both regular and security openings is the responsibility of this contractor.
4. Contract JTVCC-006 Carpentry & General Trades: All work associated with visual display boards is the responsibility of this contractor.
5. Contract JTVCC-006 Carpentry & General Trades: Modify Bullet #17 to read: This contractor shall at a minimum provide and maintain a 10lb fire extinguisher (Multi-Purpose ABC dry chemical, UL labeled, rated 3a:40bc) which shall be on site any time you or your subcontractors are working on the project. Extinguishers shall be removed each day just like other equipment.
6. Contract JTVCC-011 Plumbing, HVAC, and Controls: This contractor to furnish and install caulking of all plumbing fixtures, sinks, etc. provided by your contract.
7. Contract JTVCC-012 Electrical: This contractor to provide electrical power to the Construction Manager's office trailer located adjacent to the existing maintenance building. Power to come from an existing source located near the trailer area approx. 120 LF away from trailer.



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QUESTIONS AND ANSWERS:

1. Q. The 42000 Masonry Specification call out the following split face CMU:
- D. Concrete Masonry Veneer Units:
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
- a. Basis of design Nitterhouse Masonry Products LLC - Diener Brick Co. Collinswood, NJ 856-858-2000. Or approved equal,
- 1.) NMP Legacy Stone sizes **3 5/8" x 3 5/8" x 23 5/8"**
3 5/8" x 7 5/8" x 23 5/8"
3 5/8" x 11 5/8" x 23 5/8"
- b. Finish to be Antique Texture
- c. Color to be selected from manufacture's standard colors.
- d. Product to be installed in accordance with the contract drawings.
- The drawings call out for 4x8x16 split face. Please confirm which size CMU is correct?
- A. The specification is incorrect. Please refer to drawing A20-01 and Keynote Legend 04MA21 and 04MA22. The 2 colors are "4x8x16 Architectural Split Face Block". The intent is to match the two colors that are on the existing building 21 which appear to be a "khaki-beige" color and a "red-gray" blend. We do not the exact manufacturer or color. Nitterhouse or Fizzano Brothers are acceptable manufactures. Final color shall be approved by the architect but must match existing.
2. Q. The feed for new Panel "HP20" Is shown on the single as being fed from Panel "DP20". However, the location of Panel "DP20" is not shown. What is the location of Panel "DP20"?
- A. See attached sketch, in existing electrical room
3. Q. On drawing E-200 there are several locations that call for keyed single pole and 3-way switches. The specs (26 27 26 2.03) say to refer to the drawings. The drawings don't have any specs for these switches. Can you provide a specs or part numbers for all switches and receptacles.
- A. 3 Way Locking Switch - Hubbell Type No. HBL1223L – Color equal to other devices



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4. Q. There is a spec for Lightning Protection but it is not shown on the electrical drawings. Are we providing lightning protection for the entire building or just the addition. Can you provide a drawing to show the extent of the Lightning Protection?
- A. The existing building currently has lightning protection. The existing lightning protection is to be extended to the new addition.
5. Q. There is a spec for Security Management System (28 13 11). However, there are no system integrators listed. Is there a specific system already in place that we need to expand for this addition? Are there any pre-approved security system integrators?
- A. The new system is a standalone system separate from the existing analogue system. The existing security vendor that supports this existing analogue system is JCI.
6. Q. There is a fire alarm spec (28 31 00) but there are no devices shown on the drawings. Can you provide a fire alarm drawing?
- A. Shown on FP-100
7. Q. There is no Spec for the RTU's, is only the Basis of design acceptable?
- A. See attached specification section.
8. Q. There is no Spec for the Fabric Duct, is only the Basis of design acceptable?
- A. See attached specification.
9. Q. There is no Spec for the Duct Silencers.
- A. See attached specification section.
10. Q. On P -101 at 4.2 and A there is a note for the contractor to provide chase for storm pipe it appears to outside the building, on P-102 it appears to be in the wall. Can we get clarification and detail on what is required? Is insulation required?
- A. Chase now shown on architectural drawings. See detail 5/A31-01. Yes insulation is required





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11. Q. P-102 4 DF-1's I assume they are lambs tongue overflows can we get clarification on what is required.
A. Yes lambs tongue is correct. Equal to ZURN Z199.
12. Q. Also on P-102 there is a tie in point to the existing roof overflow not knowing the existing overflows elevation you cannot determine the amount of work required, can we get a detail and clarification on this?
A. The existing overflow drain outlet is located approximately 12' AFF.
13. Q. What is the current building and site BAS system?
A. Siemens
14. Q. Where is Exhaust fan #1 Located?
A. EF-1 was removed when the project was de-scoped.
15. Q. Are the Security drawings correct? They show work on part of the building that is not shown on any other drawings and reference room numbers that are not on the drawings.
A. The plans are correct, however SEC-000 still shows devices on the single line that have been removed from the scope of the project. See attached updated SEC-000.
16. Q. Is there a fire alarm drawing? fire alarm work is in specs and on electrical legend.
A. Fire alarm devices are shown on fire protection drawing FP-100.
17. Q. We are unable to locate the details of hardware sets S1-S7 as indicated on sheet A40-01. Specification Section 111940 Door Hardware references which manufacturers to use but section 3.06 Hardware Sets appears to be blank.
A. See attached specification sections.
18. Q. Please confirm that our crane will need to be broken down at the end of every work day. In addition does it have to be remove from work site and stored until next work day.





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- A. Yes, crane will need to be broken down every day. Yes, can be stored at the laydown area but must be locked and disabled.
19. Q. Please confirm that all drivers must have security clearance. Will TWIC Cards be sufficient?
A. Yes they all need security clearance. NO, security clearance application must be submitted and approved.
20. Q. Please confirm if we can leave job boxes on site?
A. Job box can be left in mechanical room, box must be locked, inventory sheet inside and spare key given to JTVCC Maintenance Superintendent Kulhanek.
21. Q. Please confirm that all trucks, job boxes, & men will be searched at both the beginning and end of shift.
A. Yes they will be searched in and out every time
22. Q. Please confirm if we are able to use Hilti Powder Actuated Fasteners to shoot the deck down. I.E. .22 Cal shot.
A. Yes, however Warden needs notification on what days they will be used.
23. Q. Please confirm that we are able to bring an Acetylene and Oxygen torch setup on site.
A. Yes must be on tool inventory sheet
24. Q. Please confirm that our foremen will be able to have their iPad with them as they are utilized during the day to look up drawings.
B. There are no electronics, phones, iPads, etc. allowed on site.
25. Q. Please confirm that there will be more than one guard searching and checking your Persons and tools before shift and after shift.
A. NO there is one (1) officer at the sally port that will search going in and out.





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26. Q. Please confirm that the following list of tools are permitted on site:
- a. Ladders (Extension and A-frame)
 - b. Acetylene/Oxygen Torch
 - c. Hilti Powder Actuated Nail Gun
 - d. Gas Powered Chop saw
 - e. Diesel Powered Welder
 - f. Diesel/Gas Fuel Cans
- A. Yes all must be on your tool list.
27. Q. Please confirm that there is an access gate to accommodate the following equipment, Manitex CM280 8' wide x 13'7" tall.
- A. Gate has 14'.0" H opening and 13'.0" W opening. Gate access is shown on drawings please review.
28. Q. The insulation specified in the cavity wall (042000-19 2.12) is unattainable in the minor quantities needed. A minimum order of 3 truckloads of material is needed for DOW to produce 3" CavityMate Plus. Is standard DOW Scoreboard XPS an acceptable alternate?
- A. 3" DOW Scoreboard insulation is an acceptable substitution for the CavityMate Plus.
29. Q. Spec Section 075216-9 paragraph 2.1 A lists Siplast / Garland / Tremco, it is our understating that Soprema has done several roofs in this facility, can Soprema be added to the specification with a system that will meet or exceed the specified materials?
- A. Yes, Soprema has a system that meets the specifications. They can be considered an equal.
30. Q. Section 06 40 20 is in the Carpentry and General package; however, I cannot locate any cabinets or cabinet tops on the drawings. Please advise.
- A. Spec section 06 40 20 should be deleted from the specifications



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31. Q. Reflected Ceiling Plan A70-01 Legend has CT-01 drywall and CT-02 acoustical ceiling system, the spec section states ACT-1 & ACT-2 which are not on the drawings. Please advise.
- A. ACT-1 in the specifications is CT-02 on drawing A70-01. ACT-2 does not exist and should be deleted from the specifications.
32. Q. Spec Section 09 51 33 Acoustical Metal Pan Ceilings are included in the Carpentry and General Trades Package; however, Acoustical Metal Pan Ceiling is not listed in the Reflected Ceiling Plan (A70-01) Legend. Please advise.
- A. Spec section 09 51 33 should be deleted from the Table of Contents (and the specifications if it's in there).

MODIFICATIONS TO SPECIFICATIONS:

1. Specification Section 01 11 00 Summary of Work, Contract No. JTVCC-006 Carpentry & General Trades:
- a. Page 17 - Technical Specification Sections: DELETE Section 28 13 11 Security Management System
- b. Page 18 – DELETE bullet #7 and REPLACE with the following:
- “7. This contract includes Section 11 10 00 Security Equipment Contractor, Section 11 19 10 Hollow Metal (Security & Commercial), Section 11 19 30 Security and Standard Glass and Glazing, and Section 11 19 40 Door Hardware (Security & Commercial). All work related to these sections shall be provided by this contractor. Section 28 13 11 Security Management Systems shall be provided by the electrical contractor. Coordination with your work is included in your contract.”
- c. Page 18 – DELETE bullet #17 and REPLACE with the following:
- “17. This subcontractor shall at a minimum provide and maintain a 10lb fire extinguisher (Multi-Purpose ABC dry chemical, UL labeled, rated 3a:40bc) which shall be on site any time you or your subcontractors are working on the project. Extinguishers shall be removed each day just like other equipment.”



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2. Specification Section 01 11 00 Summary of Work, Contract No. JTVCC-011 Plumbing, HVAC and Controls:
 - a. Page 27 - Technical Specification Sections: ADD sections Section 23 31 01 Fabric Ductwork, Section 23 33 19 Duct Silencers, and Section 23 74 13 Packaged Outdoor Central-Station Air-Handling Units to this contract.
 3. Specification Section 01 11 00 Summary of Work, Contract No. JTVCC-012 Electrical:
 - a. Page 30 - Technical Specification Sections: ADD Section 28 13 11 Security Management System
 - b. Page 32 – DELETE bullet #21.
 - c. Page 32 – ADD bullet #27:
"27. Section 28 13 11 Security Management System is to be provided by this contract. Coordination with other trades to be included in your proposal."
 - d. Page 32 – ADD bullet #28:
"28. Temporary power to construction manger's trailer is to be provide by this contractor."
 4. Specification Section 06 40 20 Interior Architectural Woodwork DELETE in its entirety.
 5. Specification Section 09 51 33 Acoustical Metal Pan Ceilings DELETE in its entirety.
 6. Specification Section 11 10 00 Security Equipment Contractor, DELETE this section and REPLACE with section attached to this addendum.
 7. Specification Section 11 19 10 Hollow Metal (Security and Commercial), DELETE this section and REPLACE with section attached to this addendum.
 8. Specification Section 11 19 30 Security Glass and Glazing, DELETE this section and REPLACE with section attached to this addendum.





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9. Specification Section 11 19 40 Hardware (Security and Commercial), DELETE this section and REPLACE with section attached to this addendum.
10. Specification Section 23 31 01 Fabric Ductwork: ADD this section attached to this addendum.
11. Specification Section 23 33 19 Duct Silencers: ADD this section attached to this addendum.
12. Specification Section 23 74 13 Packaged Outdoor Central-Station Air-Handling Units: ADD this section attached to this addendum

MODIFICATIONS TO DRAWINGS:

1. Drawing S0-02 General Notes: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
2. Drawing S0-03 General Notes Special Instructions: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
3. Drawing S0-04 Project Schedules: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
4. Drawing SEC-000 Security General Notes, Legends, and Abbreviations: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
5. Drawing SEC-100 Security Device Plan: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
6. Drawing SEC-101 Security Diagrams and Schedules: DELETE this sheet and REPLACE with revised sheet attached to this addendum.





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7. Drawing A11-01 Floor Plan: DELETE this sheet and REPLACE with revised sheet attached to this addendum.
8. Drawing A40-01 Door Types and Details: ADD this sheet attached to this addendum.
9. Drawing ACP-01 Code Plan: DELETE this sheet and REPLACE with revised sheet attached to this addendum.

ATTACHMENTS:

Section 11 10 00 Security Equipment Contractor
Section 11 19 10 Hollow Metal (Security & Commercial)
Section 11 19 30 Security and Standard Glass and Glazing
Section 11 19 40 Door Hardware (Security & Commercial)
Section 23 31 01 Fabric Ductwork
Section 23 33 19 Duct Silencers
Section 23 74 13 Packaged Outdoor Central-Station Air-Handling Units
Sketch - Guard Booth Electrical Panel Location
Drawing A11-01 Floor Plan
Drawing A40-01 Door Types and Details
Drawing ACP-01 Code Plan
Drawing S0-02 General Notes
Drawing S0-03 General Notes Special Instructions
Drawing S0-04 Project Schedule
Drawing SEC-000 Security General Notes, Legends, and Abbreviations
Drawing SEC-100 Security Device Plan
Drawing SEC-101 Security Diagrams and Schedules

End of Addendum No. 2



DRAWING REDACTED

SECTION 111000 - SECURITY EQUIPMENT CONTRACTOR**DESCRIPTION:**

Single source responsibility for the Security Equipment Contractor (SEC).

Summary of work includes providing the following products, labor, and services, except as noted, for all work in the following sections necessary to complete the work, as described in this specification, and as indicated on the drawings.

The following sections shall be the responsibility of the Security Equipment Contractor.

Section 111000 - Security Equipment Contractor
Section 111910 - Hollow Metal (Security and Commercial)
Section 111930 - Security Glass and Glazing
Section 111940 - Hardware (Security and Commercial)

The General Contractor shall list the Security Equipment Contractor being used on the bid form. Only Security Equipment Contractors that have been approved, either in this section, or by written addenda, will be accepted.

RELATED WORK SPECIFIED IN OTHER SECTIONS:

Fences & Gates
Casting In Place Of Products
Unit Masonry - Embedding Of Products
Painting
Electrical
Glass & Glazing

QUALITY ASSURANCE:

A. The Pre-qualified Security Equipment Contractors are as follows:

Detention Equipment Service Inc.

527 Stanton Christiana Road
Newark, DE 19713
Phone: (302) 633-1737

United Prison Equipment

6306 5th St.
Green Lane, PA 18054
Phone: (205) 234-4633

US Security

3487 Norman Bridge Road
Montgomery, AL 36105
Phone: (334) 273-8778

Maximum Security Products Corp.

3 Schoolhouse Lane
Waterford, NY 12188
Phone: (518) 233-1800

- B. Non-Pre-qualified security equipment contractors (SEC) who intend to submit a bid on the work specified in this section shall provide to the Architect the following information, fourteen (14) days prior to the bid date, and shall be approved by addenda, seven (7) days prior to the bid date; verbal approval will not be accepted:
1. Submit evidence of ten (10) years prior experience in the installation of detention products.
 2. Provide a list of all employees in supervision capacity, stating their area of responsibility, and their years of experience in that capacity.
 3. Submit a list of five (5) projects, comparable in size and construction that you have furnished within the past five (5) years. Include the project name, contact person, phone number, and contract amount.
 4. Provide an audited financial statement for the most recently completed fiscal year.
 5. Submit a listing of all projects in which the Security Equipment contractor is presently, and has been involved in litigation, and the status thereof.
 6. Submit a current letter from the detention hardware manufacturer stating that the SEC is a factory-trained, fully authorized distributor and installer of their complete line of products.
 7. Provide a letter from your surety agent stating that the bidder has the bonding capacity for this project, and that bonding will be allocated to this project, in the event that the bidder is successful.
 8. Any bidder who fails to submit the above, or submits misrepresented or incomplete information shall be disqualified.
- C. The finishing hardware schedule must be prepared by an Architectural Hardware Consultant (AHC), Certified by the Door & Hardware Institute, per Specification Section 11194. This consultant must be employed full time by this Security Equipment Contractor (SEC).

EXECUTION:

The Security Equipment Contractor's responsibilities are as follows:

1. Furnish only all hollow metal frames and borrowed lites (security & commercial). It will not be the responsibility of the Security Equipment Contractor to install any frames.
2. Furnish and install all security glass and glazing.
3. Furnish and install all commercial metal doors.
4. Furnish and install all commercial hardware.
5. Furnish and install all detention hollow metal doors and detention hardware.
6. Provide the Owner with one (1), eight (8) hour working day, for training their facility personnel in the care and maintenance of any products supplied under this contract.

7. Provide for one (1), eight (8) hour working day for a shop drawing review meeting of the hollow metal shop drawings, and the hardware schedule.

The General Contractor and/or his sub-contractor's responsibilities are as follows:

1. Install all hollow metal frames, stainless steel and or hollow metal windows, and embedded items. All frames must be installed true and plumb.
2. Furnish and install all conduit, caulking, and grout, glass.
3. Furnish and install all main power circuitry, wire and wiring for any products supplied under this section.
4. Finish paint and touch-up paint and all final cleaning of glass.
5. Unloading and Storage - The Security Equipment Contractor shall distribute out, to the location in the building, only those products that are their responsibility to install. Due to the restraints of storing material the General Contractor shall be responsible for receiving and unloading of all products regardless if the Security Equipment Contractor is installing them.
6. Any other installation not previously mentioned as part of the Security Equipment Contractor's responsibility.

End of Section

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****SECTION 111910 - HOLLOW METAL (SECURITY & COMMERCIAL)****PART 1 - GENERAL****1.01 SUMMARY**

This Section includes hollow metal detention security and commercial products as shown in the contract drawings.

1.02 PRODUCTS FURNISHED UNDER THIS SECTION

- A. Hollow metal detention security and commercial doors, swinging type with specified fire and/or bullet resistant ratings as shown in the door schedule. Sliding type doors shall be provided where indicated. Doors shall be of the types and sizes shown on the contract drawings and as specified herein.
- B. Hollow metal detention security and commercial frames with specified fire and/or bullet resistant ratings as shown in the door schedule. Frames shall be of the types and sizes shown on the contract drawings and as specified herein.
- C. Hollow metal detention security and commercial panels where shown, similar in construction to doors, including fire and/or bullet resistant ratings where specified in the door schedule.

1.03 RELATED PRODUCTS FURNISHED BY OTHERS BUT NOT SPECIFIED IN THIS SECTION

- A. Hardware
- B. Security Glass and Glazing
- C. Gaskets and Weather-strips

1.04 RELATED SECTIONS

- A. Section 03300 - Cast in Place Concrete
- B. Section 03345 - Concrete Floor Finishing
- C. Section 03400 - Pre-cast Concrete
- D. Section 04200 - Masonry System
- E. Section 05120 - Structural Steel
- F. Section 09900 - Painting
- G. Section 111000 - Security Equipment Contractor
- H. Section 111930 - Security Glass and Glazing
- I. Section 111940 - Hardware (Security & Commercial)

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****1.05 REFERENCES**

- A. ASTM A 167-92b, Standard Specification for Stainless and Heat Resisting Chromium - Nickel Steel Plate, Sheet and Strip, Type 300 Series.
- B. ASTM A 366/A 366M-91, Specification for Steel, Carbon, Cold Rolled Sheet, Commercial Quality
- C. ASTM A 569/A 569M-91a, Specification for Steel, Carbon (0.15 Maximum Percent), Hot Rolled Sheet and Strip, Commercial Quality
- D. ASTM A 653/A 653 M-94, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dipped Process
- E. ASTM B 117-90, Method of Salt Spray (Fog) Testing
- F. ASTM C 143-90a (1990), Standard Test Method for Slump of Hydraulic Cement Concrete
- G. ASTM D 610-85 (1989)j, Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
- H. ASTM D 714-87 (1994), Standard Test Method for Evaluating Degree of Blistering of Paints
- I. ASTM D 1735-87, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
- J. ASTM E 152-81a, Method for Fire Tests of Door Assemblies
- K. ASTM E 163-84, Standard Methods of Fire Tests of Window Assemblies
- L. ASTM F 1450-92, Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
- M. ASTM F 1577-95, Standard Test Methods for Detention Locks for Swinging Doors
- N. NAAMM Hollow Metal Manual
- O. NAAMM HMMA 850-83, Fire-Rated Hollow Metal Doors and Frames, Second Edition
- P. NFPA 80-95, Fire Doors and Windows
- Q. NFPA 252-95, Standard Methods of Fire Tests of Door Assemblies
- R. NFPA 257-96, Methods for Fire Test Window Assemblies
- S. UL-9, 5th edition, Fire Tests of Window Assemblies
- T. UL 10B, 8th edition, Fire Tests of Door Assemblies
- U. UL 752, Bullet - Resisting Equipment

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ANSI	American National Standards Institute, Inc. 11 West 42nd Street 13th Floor New York, NY 10036
ASTM	American Society for Testing and Materials 100 Bar Harbor Drive West Conshohocken, PA 19428-2959
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Avenue Suite 100 Chicago, Illinois 60603
NFPA	National Fire Protection Association 1 Batterymarch Park P.O. Box 9101 Quincy, MA 02269
UL	Underwriters Laboratories 333 Pfingsten Road Northbrook, Illinois 60062
WH	Inchcape Testing Services Warnock Hersey 530 Garcia Avenue Pittsburgh, California 94565

1.06 TESTING AND PERFORMANCE

- A. Load Testing of Doors and Door/Frame Assemblies Performance Grades for each individual opening shall be as indicated on the contract drawings and in the door schedule. Performance Test requirements for each opening shall be as indicated for individual grade number designations shown in Table 1.

Grade No.	Face Sheet Gauge	Static Load Test	Rack Load Test	Impact Test				ASTM Reference Standards
				Impact Load	Lock Impacts	Hinge Impacts	Glazing Impacts	
1	12	14000	7500	200 lbf.	600	200	100	F1450, F1577
2	12	14000	7500	200 lbf.	400	150	100	F1450, F1577
3	14	11000	5500	200 lbf.	200	75	100	F1450, F1577
4	14	11000	5500	200 lbf.	100	35	100	F1450, F1577

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1. Test Specimens

Test doors shall be 3' 0" x 7' 0", constructed in accordance with section 2.01 herein, with 100 square inch vision panel, 4" x 25" clear opening, positioned generally as shown in ASTM F 1450, Figure 3. Test Frames shall be constructed in accordance with section 2.03 herein. Test doors and frames shall be prepared for hardware as specified in ASTM F 1450, Section 6 "Specimen Preparation".

2. Testing Procedures

a. Door Assembly Impact Test

Test doors and frames shall be furnished with hardware in accordance with ASTM F 1450 Section 6, "Specimen Preparation". Latch throw of the lock shall not exceed 1". Assemblies shall be tested in accordance with Table 1 herein and procedures outlined in ASTM F 1450, 7.2 "Door Assembly Impact Test".

b. Door Static Load Test

Doors shall be tested in accordance with Table 1 herein and procedures outlined in ASTM F 1450, 7.3 "Door Static Load Test".

c. Door Rack Test

Doors shall be tested in accordance with Table 1 herein and procedures outlined in ASTM F 1450, 7.4 "Door Rack Test".

3. Performance Criteria

Performance criteria for load testing of each grade indicated in Table 1 shall be in accordance with applicable paragraphs of ASTM 1450, and Section 7 "Procedures".

B. Removable Glazing Stop Test

1. A rectangular view window test frame shall be constructed with a glass opening size of 28" x 33" \pm 1". The frame shall be constructed in accordance with Paragraph 2.03. Refer to HMMA 863, Figure 5, for test frame configuration.
2. A steel plate of 3/8" minimum thickness shall be glazed in place using the specified glass stop.
3. The test frame assembly, constructed in accordance with these specifications, shall be rigidly mounted in the vertical position with the removable glass stop located on the opposite side of the 3/8" plate from the impact ram.
4. A target on the impact side of the 3/8" plate shall be marked in one corner no more than 6" away from the stops.

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5. Using the door ram pendulum system specified in ASTM F 1450, Figure 2, deliver four hundred (400) impacts of 200 ft-lbs. each on the target area. Removable glass stops and the 3/8" plate shall remain firmly in place so that removal cannot be accomplished without removing the retaining screws. There shall be no more than (1) broken screw in the assembly after impact testing.

C. Bullet Resistance

1. Where specified for individual openings, bullet resistance shall be certified by an independent testing laboratory under the testing procedure described in UL Standard 752, and consistent with ASTM F 1450, Section 6, "Specimen Preparation" and Paragraph 7.1 "Bullet Penetration". The bullet resistance rating shall be Level 3 in accordance with UL 752.

D. Test Reports

Reports and documentation of testing and performance shall be in accordance with ASTM F 1450, Section 9, and "Report". The manufacturer shall submit to the architect evidence of compliance with ASTM F 1450 as specified herein and HMMA 863 Section 1.06D "Removable Glazing Stop Test". Test reports and documentation for removable glazing stop test shall be in accordance with ASTM F 1450.

1.07 QUALITY ASSURANCE:

Approval as a Qualified Manufacturer shall require, as a minimum, substantiation of the following requirements no less than ten (10) days prior to bid date:

A. Manufacturer's Qualifications

1. Qualified manufacturers shall have personnel, plant equipment, and capacity capable of fabricating hollow metal door and frame assemblies of the types and quantities required for this project. These capabilities shall be substantiated by current documentation of number of employees, a current listing of production equipment, and production space.
2. Qualified manufacturers shall employ production welders qualified to weld material types, thicknesses, and joint types typical for the hollow metal doors and frames on this project. These qualifications shall be substantiated by a copy of "Welders Certification" for employees performing welding operations on hollow metal for this project.
3. Qualified manufacturers shall have a minimum of ten- (10) year's experience of regularly and successfully producing hollow metal of the type required for this project. This experience shall be substantiated by a list of representative projects for which the manufacturer has supplied detention security hollow metal including dates of the project completion.
4. Qualified manufacturers shall have tested frame and door construction specified in sections 2.01 and 2.03, in accordance with Section 1.06 "Testing and Performance" and successfully met the performance criteria of the same. This qualification shall be substantiated by an independent laboratory test report in accordance with Section 1.06 "Testing and Performance" as specified herein.

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1. All door and frame construction shall be in accordance with construction of assemblies, which meet the requirements of Section 1.06 "Testing and Performance".
 - a. The detention hollow metal manufacturer shall submit a notarized certificate stating that the construction, materials, and methods used are in accordance with these specifications and have been proven to meet performance standards described in Section 1.06 "Testing Performance".
2. Fabrication methods and product quality shall meet standards set by the Hollow Metal Manufacturers Association, HMMA, a division of the National Association of Architectural Metal Manufacturers, NAAMM, as set forth in these specifications.
3. Fire rated doors and frames shall be provided for those openings indicated in the schedule as requiring fire protection ratings. Such doors and frames shall be constructed as tested in accordance with ASTM E 152, UL-10B or NFPA - 252 and labeled by a recognized testing agency having a factory inspection service.
 - a. If any door or frame specified in the contract documents to be fire-rated cannot qualify for appropriate labeling because of its design, hardware or any other reason, fabrication of the affected item shall not begin until the issue is satisfactorily resolved and the resolution is approved.

C. On-site Testing and Inspection of Products

Upon direction of the Architect, the detention hollow metal manufacturer shall supply one (1) additional cell door and/or frame for the purpose of random on-site testing in accordance with the following:

1. One cell door shall be randomly selected from the job site and sawed in half or otherwise taken apart as necessary for verification that construction is in accordance with test report details.
 - a. Further, the door shall be cut apart at the edge seams, end channels, stiffeners, or other components as necessary to investigate the method and quality of welding. Welds at such locations shall be chiseled and/or pried apart to insure that weld fusion is such that the parent metal tears before the weld breaks loose. If more than 5% (1 out of 20) of the welds investigated fail, the doors will be condemned because of insufficient weld quality. If the doors are condemned, the hollow metal manufacturer shall replace or rework all doors to bring them into compliance.

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2. One cell frame shall be randomly selected from the job site and cut apart at the corner joints to insure continuous welding at the joint, and cut apart at the mull joints to insure that welding methods comply with Section 2.03 of this specification.
 - a. Hinge reinforcements, strike reinforcements, or other components shall be chiseled or pried out of the frame to insure that weld fusion is such that the parent metal tears before the weld breaks loose. If more than 5% (1 out of 20) of the welds investigated fail, the frames will be condemned because of insufficient weld quality. If the frames are condemned, the hollow metal manufacturer shall replace or rework all frames to bring them into compliance.
3. If investigation of welds results in condemnation of materials, the manufacturer shall be allowed a 3-week maximum time period to begin rework or replacement. Rework or replacement shall be done in a manner not to encumber the project schedule.
4. If welds, methods and materials are judged to be satisfactory, the materials will be approved, and the destroyed materials will be replaced at no cost to the owner. The manufacturer shall be allowed a minimum of 2 weeks to fabricate and ship replacement materials.

1.08 SUBMITTALS**A. Submittal Drawings**

1. Show door and frame elevations, sections and construction.
2. Show listing of opening descriptions including quantities, gages, locations, and anchors.
3. Identify materials on the submittal such that they may be referenced by markings used on the contract drawings.
4. Indicate Performance Grade levels on the submittal as they are shown on the contract drawings and in the door schedule.

B. Submit samples as follow, upon request of the Architect:

1. Door: 1'0" x 1'0" corner section with hinge preparation showing top and internal construction.
2. Frame: 1'0" x 1'0" corner section showing weld joint of head to jamb. Include hinge mortise, reinforcement and mortar guard in one rabbet, and glazing stop applied as specified in the opposite rabbet. Glazing stop shall be applied to both head and jamb section to show corner joint.
3. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by comparison with the samples may be cause for rejection of the work.

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- C. Following the submittal of detention hollow metal drawings, a coordination and review meeting shall be held as directed by the Architect. The meeting shall be attended by representatives of the Architect, Contractor, hollow metal manufacturer, hardware supplier, and other related trades as necessary. The purpose of this meeting shall be to obtain approval of hollow metal and hardware submittals in order that production may begin. Following approval, all revisions shall be made and field use drawings available for distribution within two weeks after the coordination meeting.
- D. “As built” hollow metal drawings shall be provided to the contractor upon written request. “As built” drawings shall be made available within two weeks after all hollow metal is placed into production.
- E. Production of hollow metal shall begin not more than two weeks after final approved submittal drawings and hardware has been received by the manufacturer. Production shall be coordinated to provide for trailer load quantities to be delivered on a regular schedule such that the progress of the job is not delayed. Provisions shall be made by the responsible contractor for onsite storage as necessary to prevent any delays in the hollow metal production schedule. A hollow metal delivery priority list shall be provided by the General Contractor and shall be used as a production guideline by the hollow metal manufacturer. The priority list shall be provided at the time of the coordination meeting. Upon changes in priority by the General Contractor, the manufacturer shall provide a revised delivery schedule.
- F. It shall be the direct responsibility of the manufacturer of both detention and commercial hollow metal to furnish to the General Contractor guaranteed clear opening sizes where glass and/or panels are indicated on the drawings within 2 weeks after the subject frames/doors have been detailed for production.

1.09 ACCEPTABLE MANUFACTURERS:

- 1. Any manufacturer not listed must submit all information outlined under the section of “submittals” in this specification, and be approved ten (10) days prior to the bid date, by written addenda. Verbal approval will not be acceptable. Acceptable detention manufacturers are: **Trussbilt** , **American Steel Products** and **Habersham Metal Products**. Acceptable commercial manufacturers are **Curries** , **Habersham Metal Products**, **American Steel Products**, and **Trussbilt**

1.10 WARRANTY

All hollow metal work shall be warranted from defects in workmanship and quality for a period of one (1) year from shipment.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****PART 2 - PRODUCTS****2.01 HOLLOW METAL DOORS****A. Materials**

1. Doors shall be constructed of commercial quality, level, cold-rolled steel conforming to ASTM A 366/A 366M or hot rolled, pickled and oiled steel conforming to ASTM A 569/A 569M. The steel shall be free of scale, pitting, coil breaks or other surface blemishes. The steel shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
2. Detention Doors: Face sheets shall be 14-gage minimum thickness as indicated in the schedule. Detention doors are listed in hardware sets S1 through S4.
3. Commercial Doors: Face sheets shall be 16-gage minimum thickness as indicated in the schedule. Commercial doors are listed in hardware sets B1 through B7.
4. Exterior doors shall have a zinc coating, applied by the hot-dip process, conforming to ASTM A653/A653M (A60).

B. Construction:

1. All doors shall be of the types, sizes, and grades shown in the contract documents and on the approved submittal drawings. Doors shall be constructed in accordance with these specifications and as tested in accordance with the applicable performance requirements of Section 1.06.
2. Door thickness shall be 2" minimum for detention doors. Doors shall be neat in appearance and free from warpage and buckle. Edge bends shall be true and straight and of minimum radius for the material used.
3. Door face sheets shall be joined at their vertical edges by a continuous weld extending the full height of the door.
- 4a. Detention door face sheets shall be vertically stiffened by formed steel sections, which are continuous and upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 16 gage minimum thickness, spaced so that the vertical interior webs shall be no more than 4" apart and securely attached to both face sheets by spot welds spaced a maximum of 3" o/c. vertically. After assembly of the door, stiffeners shall be welded together, on both sides, over their entire length with 1/2" long welds spaced 16" o.c. maximum. Spaces between stiffeners shall be filled with 6 lbs./cu.ft. density mineral rockwool batt-type material, minimum.
- 4b. Commercial door face sheets shall be vertically stiffened by formed steel sections, which are continuous and upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 18 gage minimum thickness, spaced so that the vertical interior webs shall be no more than 6" apart and securely attached to both face sheets by spot welds spaced a maximum of 5" o.c. vertically. Spaces between stiffeners shall be filled with 6lbs./cu.ft. density mineral rockwool batt-type material, minimum.

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5. The vertical edges shall be reinforced by a continuous steel channel, not less than 10-gage thickness extending the full height of the door. Channel which is notched or broken at the hinge mortises shall not be acceptable. Non-continuous channel at the lock edge shall be acceptable only to accommodate hardware options. In such cases, hardware reinforcements shall be welded to the channel such that they become an integral part of the channel. The top and bottom edges shall be closed with a continuous channel not less than 10-gage thickness. The vertical channels shall be spot welded 3" o.c. The 10 gage closing end channel shall be spot welded to both face sheets 3" o.c. maximum and continuously welded to the vertical reinforcing channel at all four corners producing a fully welded perimeter reinforcing channel.

- 6a. The end channels on detention doors shall be fitted with an additional flush-closing channel of not less than 12-gage thickness. The flush closing channel shall be welded in place at the corners with continuous welds and 1 1/2" long welds, 12" o.c. maximum along the length, on both sides. Installation of closing channel using screws, security or otherwise, shall be unacceptable. The end channel and flush-closing channel shall be installed so they are permanent and non-removable.

- 6b. The end channels on commercial doors shall be fitted with an additional flush-closing channel of not less than 16-gage thickness. The flush closing channel shall be screwed in place at the corners and in the middle. The end channel and flush-closing channel shall be installed so they are permanent and non-removable.

7. Edge profiles shall be provided on both vertical edges of doors as follows:
 - Single acting doors - beveled 1/8" in 2" profile
 - Sliding doors or equivalent - square profile

8. Hardware reinforcements:
 - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accordance with the final approved hardware schedule and templates provided by the hardware supplier. Where surface mounted, or non-templated mortised hardware is to be applied, doors shall be reinforced only and all drilling and tapping shall be done by others in the field.

 - b. Minimum thickness of hardware reinforcements shall be as follows:
 - Full mortise hinges and pivots7 gage
 - Surface applied maximum security hinges1/4"
 - Reinforcements for hanger attachment on sliding doors.....per device manufacturer's recommendations
 - Reinforcements for lock fronts, concealed holders.....7 gage
 - Internal reinforcements for other surface applied hardware ..7 gage
 - Reinforcements for factory drill and tap applications for surface mounted closers.....12 gage extruded to 3/16" and tapped

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Reinforcements for field drill and tap applications for surface mounted closers.....7 gage

- c. Hinge and pivot reinforcements shall consist of a press formed 7 gage angle which is projection welded in 6 places to the face of the door and additionally plug welded at each end to the opposite door face sheet forming a rigid structural angle reinforcement at each hinge. All reinforcements for mortised hardware occurring in the door edge shall be securely welded to both face sheets of the door. Flat or offset hinge reinforcements welded to the inside edge of the door or to perimeter edge channel which has been notched or cut to accommodate hinge mortise shall be unacceptable.
- d. Door Mounted Mechanical Lock Preparations
 1. Doors requiring mechanical pocket type locks shall be prepared using a unitized pocket preparation, which after fabrication forms a one-piece box. The lock box shall provide for the lock mounting plate to be recessed into the door such that, when secured in place, the outside surface of the mounting plate is flush with the surface of the door face sheet. The unitized lock box shall be 10 gage, and drilled and tapped to receive the lock mounting plate. Before assembly of the door, the lock preparation shall be spot welded inside the door face sheet with a minimum of 6 spotwelds.
 2. The front two corners of the lock box shall be welded to the perimeter edge channel thereby becoming an integral part of the internal framework of the door. A 22" long, 10-gage channel shall be positioned vertically and adjacent to the rear edge of the lock box, then spot-welded to the inside of the face sheet. Providing the location of other options allow, the reinforcing channel shall be located such that equal lengths extend above and below the lock box. The back corners of the lock box shall be welded to the reinforcing channel.
 3. After assembly of the door, the back of the lock box shall be spotwelded; six places evenly spaced, to its matching door face sheet. The finished preparation shall be such that the 10-gage lock box completely surrounds the lock and is securely welded to both face sheets, the reinforcement channel, and the perimeter edge channel.
- e. Where electrically operated hardware is required, and as shown on approved submittal drawings, hardware enclosures and junction boxes for doors shall be provided and shall be interconnected using U.L. approved 1/2" conduit, elbows, and connectors. Also, where shown on approved submittal drawings, junction boxes with access plates shall be provided to facilitate the proper installation of wiring. Access plates shall be the same gage as the door and fastened with a minimum of four 8-32 torx drive tamper resistant screws, not to exceed 6" o.c.

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9. Glass moldings and stops:
 - a. Where specified, doors shall be provided with steel moldings to secure glazing by others, in accordance with glass sizes and thicknesses provided by the contractor and shown on approved submittal drawings.
 - b. Fixed glazing molding shall be not less than 12 gage, and shall be spot-welded to both face sheets 3" o.c. maximum.
 - c. Removable glazing stop in detention hollow metal doors shall be pressed steel angle, not less than 10-gage thickness. Angle stops shall be notched and tight fitting at the corner joints, and secured in place using 1/4-20 SAE grade #8 button head tamper resistant screws, spaced 9" o.c. maximum. Glazing stops and screws shall satisfy the performance criteria outlined in Section 1.06.B.
 - d. Where glass thickness dictates, 12 gage offset surface mounted glazing stop shall be used. The corners shall be tight fitting mitered, welded and ground smooth. The glass stop shall be secured to the face of the door using 1/4-20 SAE grade #8; button head tamper resistant screws spaced 9" o.c. maximum.
 - e. The metal surfaces to which glazing stops are secured and the inside of the glazing stops shall be chemically treated for maximum paint adhesion and painted with a rust inhibitive primer prior to installation in the door.
10. Louvers shall be of the welded inverted "v" type construction providing free air delivery as specified. A rectangular louver shall not exceed 18" in width without being reinforced at its midpoint by a vertical steel bar not less than 3/4" in diameter. The inverted "v" type vanes shall be not less than 12 gage and shall be spaced so that no rigid flat instrument can be passed through them. Insect screens and/or flattened expanded metal not less than 12 gage shall be provided on louvered doors in exterior locations where shown on approved submittal drawings.
11. Speaking devices shall consist of a rectangular pattern of round holes, no more than 1/4" diameter, in both face sheets directly across from each other. The minimum size of the rectangular hole pattern shall be 1" high x 4" wide with a minimum of two rows of holes spaced no more than 1" o.c. The interior of the door between the rectangular hole patterns shall be baffled using pressed steel sections, not less than 14 gage, so that no objects can be passed through.
12. Food pass openings:
 - a. The food pass opening shall be a flush opening fabricated using interior channels, 12 gage thickness, securely welded to the inside of both face sheets. The four corner seams shall be continuously welded from the interior side. The finished opening shall be of such construction that it cannot be dismantled or otherwise affected by tampering or scraping.
 - b. The food pass shutter shall be constructed from two 10 gage steel plates spot welded together to produce an inset fit that, when closed, will prevent tampering with the lock and hinges.
 - c. The shutters shall be treated for maximum paint adhesion and given a shop coat of rust inhibitive primer. Shutters shall be shipped loose for installation in the field by

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- A. Hollow metal panels shall be of the same materials, construction, and finish as specified for detention hollow metal doors.

2.03 HOLLOW METAL FRAMES

A. Materials

1. Frames shall be constructed of commercial quality, cold rolled steel conforming to ASTM A 366/A 366M or hot rolled, pickled and oiled steel conforming to ASTM A 569/A 569M. The steel shall be free of scale, pitting, coil breaks or other surface defects.
2. Detention Frames: Steel for these openings shall be 12-gage minimum thickness. Detention frames are listed in hardware sets S1 through S4.
3. Commercial Frames: Steel for these openings shall be 14-gage minimum thickness. Commercial frames are listed in hardware sets B1 through B7.
4. Exterior openings shall have a zinc coating applied by the hot-dip process conforming to ASTM A653/A653M (A60).

B. Construction:

1. All frames shall have integral stops and be welded units of the sizes and types shown in the contract documents and on the approved submittal drawings. Frames shall be constructed in accordance with these specifications and as tested in accordance with applicable performance criteria specified in Section 1.06.
2. All finished work shall be neat in appearance, square, and free of defects, warp or buckle. Pressed steel members shall be straight and of uniform profile throughout their lengths.
3. Jamb, header, mullion and sill profiles shall be in accordance with the contract drawings and as shown on the approved submittal drawings.
4. Corner joints shall have all contact edges closed tight with faces mitered and stops butted. Corner joints shall be continuously welded and faces finished smooth. The use of gussets or splice plates shall not be acceptable.
5. Minimum height of stops in door openings shall be 5/8". Height of stops in security glass or panel openings shall be as shown on approved submittal drawings. Cut-off (sanitary type) stops, where scheduled, shall be capped as detailed on the contract drawings at the heights shown. Meeting edges of jambs below cut-off stops shall be free of burrs and tightly joined to form a smooth hairline joint. Welds shall be concealed.

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- 6. Frames for multiple openings shall have mullion members which, after fabrication, are closed tubular shapes conforming to profiles shown on approved submittal drawings, and having no visible seams or joints. All joints between faces of abutted members shall be continuously welded and finished smooth. All joints between stops of abutted members shall be welded along the height of the stop and shall be left neat and uniform in appearance.
- 7. When shipping limitations dictate, frames for large openings shall be fabricated in sections designed for assembly in the field by others. Alignment plates or angles shall be installed at the corners of the profile, and shall extend at least 4" on either side of the joint. Such components shall be the same gage as the frame. Field joints shall be made in accordance with the approved submittal drawings. The contractor responsible for installation shall provide for welding and finishing all field joints between faces of abutted members.

8. Hardware Reinforcement and Preparation:

- a. Frames shall be mortised, reinforced, drilled and tapped for all templated mortised hardware only, in accordance with the final approved hardware schedule and templates provided by the hardware supplier.

- b. Minimum thickness of hardware reinforcing plates shall be as follows:

Hinge and pivot reinforcements.....7 gage x 1 1/2" x 10" length

Strike reinforcements.....7 gage

Closer reinforcements.....7 gage

Flush bolt reinforcements.....7 gage

Reinforcements for surface applied hardware.....12 gage

- c. Hinge and pivot reinforcements shall consist of 7 gage x 1 1/2" wide x 10" long straps spot welded in three places in a triangular pattern at each end for a total of six welds per hinge. All hinge reinforcements shall be additionally reinforced by a 7 gage x 1 1/2" wide angle welded in two places to the strap reinforcement and two places to the inside face of the frame to prevent possible twisting and deformation of the reinforcement while in use. Tapped holes in reinforcements shall be protected by a 26-gage minimum thickness grout guard which is welded in place and made grout tight.

- d. Jamb Mounted Detention Lock Preparations

- 1. Frames requiring jamb mounted detention locks shall be prepared with a wide face lock jamb to accept a unitized pocket which consists of a lock box fabricated from one piece of 10-gage steel. The box preparation shall be punched for keying options and conduit fittings as required. The box shall be drilled and tapped to receive a 10-gage lock preparation cover plate furnished by the hollow metal manufacturer. The cover plate shall be furnished installed with (8) 1/4 - 20 torx drive flat head security screws.

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2. The box preparations shall be furnished with factory installed threaded studs of size and location to accommodate lock mounting. The manufacturer shall furnish lock nuts installed or shipped separately, at the option of the manufacturer.
 3. Where hardware requirements allow, the box preparation shall be fabricated and mounted such that the cover plate is recessed and flush with the outside face of the of the frame. The frame rabbet is to be cut only to allow passage of the latch bolt and deadlock actuator, providing a lock preparation which prevents the lock front and case from being exposed.
 4. Frames prepared to accept locks keyed on both sides shall be provided with a keywell 5" wide x 5" high of the depth required, in order to allow access to the cylinder opposite the cover plate side. The keywell shall be welded to the back of the lock box at the four corners and inside the frame face at the four corners. Welds shall be 1/2" long. The 5" square opening in the frame face shall be deburred and dressed smooth.
- e. Jamb Mounted Narrow-line (Mortised) Lock Preparations
1. Preparation for locks mortised in jambs having a narrow face dimension shall provide for support of the lock on three sides by the lock reinforcement.
 2. The reinforcement shall be fabricated and installed in the frame such that rotation or twist of the lock under impact conditions is minimized thus enhancing the impact resistance of the assembly.
 3. The lock reinforcement shall be 10-gage minimum thickness and shall be welded inside the frame face and inside the frame rabbet. Lock mounting tabs shall be an integral part of the lock reinforcement. The lock reinforcement shall be punched as required to accommodate keying options.
 4. The lock preparation and reinforcement shall be covered with a grout guard which shall provide for protection from grout of a 4" maximum slump consistency which is hand troweled in place. Grout guards shall be prepared with conduit fittings where required for field connections.
- f. In cases where electrically operated hardware is required, and as shown on approved submittal drawings, hardware enclosures and junction boxes for frames shall be provided, and shall be interconnected using UL approved 3/4" minimum conduit, elbows, and connectors. Also, where shown on submittal drawings, junction boxes with access plates shall be provided to facilitate the proper installation of wiring. Access plates shall be the same gage as the frame and fastened with a minimum of four 8-32 torx drive tamper resistant screws, not to exceed 6" o.c.

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- g. Conduit runs around frame section joints shall be 3/4" U.L. approved EMT to facilitate unrestricted wire feed. Where meeting sections permit, conduit shall be bent at a 1 1/2" minimum radius at turns. Where narrow profiles prevent bending conduit, turns shall be fabricated using 90-degree sweep elbows. Short 90-degree elbows are permitted only at entrances to junction boxes which allow adequate hand access and not in conduit runs. Conduit fittings shall be U.L. approved and either compression type or a combination of compression and threaded type.
9. Grout guards shall be provided at all hardware preparations, glazing stop screws and silencer preparations. Grout guards shall be sufficient to protect preparations from grout of a 4" maximum slump consistency, which is hand troweled into place.
- a. Grout guards for glazing screws shall be tight fitting plastic caps covering the exposed portion of the screws inside the frame throat, around the perimeter. Where mullions are required to be grouted, screws inside mullions shall be protected with steel grout guards welded in place.
 - b. Silencer preparations shall be protected by steel grout guards where accessible from the frame throat. Where limited access prevents installation of metal grout guards in mullions, silencers shall be factory furnished and installed.

10. Floor Anchors:

- a. Floor anchors provided with two holes for fasteners shall be secured inside jambs with four (4) spot welds per anchor minimum.
- b. Where scheduled, adjustable floor anchors, providing not less than 2" height adjustment, shall be secured inside jambs with four (4) spot welds per anchor minimum.
- c. Material thickness of floor anchors shall be the same as frame.

11. Jamb Anchors:

- a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the strap and stirrup type made from the same gage steel as the frame. Straps shall be not less than 2" x 10" in size and perforated. The number of anchors provided on each jamb shall be as follows:
 - Borrowed lite frames.....2 anchors plus 1 for each 18" or fraction thereof over 3'0", spaced at 18" maximum between anchors
 - Door frames.....2 anchors plus 1 for each 18" or fraction thereof over 4'6", spaced at 18" maximum between anchors
(fire ratings may require additional anchors)

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b. Embedment Masonry Type

1. Frames for installation in pre-finished masonry or concrete openings shall be provided with removable faces at the jambs, and 3/16" x 2" x 2" angle anchors 4" long spaced as described in Paragraph 2.02B.11.a. The frame anchors shall be located to coincide with matching embedded anchors to be provided for installation in the wall.
2. Embedded wall anchors shall consist of a 3/16" x 4" wide x 6" plate with 3/16" x 2" x 2" angle anchors 4" long welded in place at locations to match angle anchors in frames. The embed plate shall be provided with two #4 re-bar wall anchors 10" long minimum, with 2" x 90 turn down on ends continuously welded in place, and spaced as described in Paragraph 2.03.B.11.a. Embedments shall be prime painted in accordance with Paragraph 2.06.
3. Angle anchors shall each be secured to jamb and to embed plate with two 1" long arc welds at each end of the anchor. Anchors shall be shipped loose.
4. The complete anchorage system shall provide that the jamb faces be removed from the frames in the field by the contractor responsible for installation, and the frames be moved into the opening until the frame anchors contact and match the embedded anchors. The contractor responsible for installation shall field weld all anchors and install the jamb faces in place. Embedment anchoring details shall be provided on approved submittal drawings.

c. Expansion Bolt Type

1. Frames for installation in existing masonry or concrete walls shall be prepared for expansion bolt type anchors. The preparation shall consist of a countersunk hole for a 3/8" diameter bolt and a spacer from the unexposed surface of the frame to the wall. The spacer shall be welded to the frame and the preparation spaced as described in Paragraph 2.03.B.11.a.
2. After sufficient tightening of the bolt, the bolt head shall be welded by the installation contractor so as to provide a non-removable condition. The welded bolt head shall be ground, dressed and finished smooth.

d. Frames to be installed in pre-finished concrete, masonry or steel openings, shall be constructed and provided with anchoring systems of suitable design as shown on the approved submittal drawings.

12. Frames indicated to be installed in pre-finished openings and required to have jambs grouted shall be provided with grout holes at each jamb to allow for grouting after installation.

- a. Grout holes and electrical access holes shall consist of a 1 1/4" square hole in the face of each jamb at the top of the frame. The square hole shall be backed up by a plate with a 1 1/4" round hole to allow for grouting. Frames shall be furnished with plugs to be installed by the responsible contractor after grouting. Plugs shall be welded in place and finished smooth.

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- b. Precautions shall be taken by the installation contractor to protect all frame preparations from grout leakage resulting from the use of a light consistency grout (greater than a 5" slump).
13. All frames shall be provided with two temporary steel spreaders welded to the bottom of the jambs to serve as bracing during shipping and handling. Spreaders shall be removed prior to installation.
14. Removable glazing stops:
- a. Removable glazing stop in detention hollow metal frames shall be pressed steel angle, not less than 10-gage thickness. Angle stops shall be notched and tight fitting at the corner joints, and secured in place using 1/4-20 SAE grade #8 button head tamper resistant screws spaced 9" o.c. maximum. Glazing stops and screws shall satisfy the performance criteria outlined in Section 1.06.B.
 - b. The metal surfaces to which glazing stops are secured and the inside of the glazing stops shall be chemically treated for maximum paint adhesion and painted with a rust inhibitive primer prior to installation in the frame.

2.04 CLEARANCES AND TOLERANCES

A. Edge clearances for swinging doors shall not exceed the following:

- 1. Between doors and frames at head and jambs:.....1/8"
- 2. Between edges of pairs of doors:.....1/8"
- 3. At door sills where a threshold is used:.....3/8"
- 4. At door sills where no threshold is used:.....3/4"
- 5. Between door bottom and nominal surface of floor coverings as provided in NFPA 80 – 1992 Paragraph 2-2.7:.....1/2"

- a. Finished floor is defined as the top surface of floor, except when resilient tile or carpet is used, when it is the top of the concrete slab.

B. Manufacturing tolerance shall be maintained within the following limits:

1. Frames for single or pair of doors:

Width measured between rabbets at the head:.....Nominal opening width
+ 1/16", -1/32".

Height (total length of jamb rabbet):.....Nominal opening height
± 3/64".

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Cross sectional profile dimensions:

Face.....	± 1/32"
Stop.....	± 1/32"
Rabbet.....	± 1/32"
Depth.....	± 1/32"
Throat.....	± 1/16"

Frames overlapping walls to have throat dimension 1/8" greater than dimensioned wall thickness to accommodate irregularities in wall construction.

2. Doors:

Width.....	±3/64"
Height.....	± 3/64"
Thickness.....	± 1/16"
Hardware cutout dimensions (Template dimensions).....	+ 0.015" - 0"
Hardware location.....	± 1/32"
Bow/Flatness.....	± 1/8"

2.05 HARDWARE LOCATIONS

A. The location of hardware on doors and frames shall be as listed below. All dimensions except the hinge locations are referenced from the finished floor as defined in Paragraph 2.04.A. When hollow metal frames only are specified for use with doors to be furnished by others, the hardware preparation on the door is to be governed by its location on the frame. The door supplier is responsible for coordinating hardware locations.

B. Hinges:

Top.....	5" from frame head to top of hinge
Bottom.....	10" from finished floor to bottom of hinge
Intermediate.....	centered between top and bottom hinges
On Dutch Doors.....	5" from frame opening to top of top hinge; 10" from finished floor to bottom of bottom hinge; 5" from split line to top and bottom respectively
of	lower and upper intermediate hinges.

Unit and integral type locks and latches.....	40 5/16" to centerline of strike
Deadlocks.....	48" to centerline of strike
Exit hardware.....	38" to centerline of cross bar
Door pulls.....	42" to centerline of grip
Push/pull bars.....	42" to centerline of bar
Arm pulls.....	47" to centerline
Push plates.....	48" to centerline of plate

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2.06 FINISH

After fabrication, all tool marks and surface imperfections shall be filled and sanded as required to make exposed surfaces smooth and free from irregularities. After appropriate metal preparation, all exposed surfaces of doors and frames shall receive a rust inhibitive primer which meets or exceeds ASTM B 117 Salt Spray for 150 hours with a rust grade of not less than 6 as defined in ASTM D 610, and ASTM D 1735 Water Fog Test for Organic Coatings for 200 hours with any quantity of #8 blisters but no more than "few" #6 blisters as illustrated in ASTM D 714.

PART 3 - EXECUTION

3.01 SITE STORAGE AND PROTECTION OF MATERIALS

- A. The contractor responsible for installation shall remove wraps or covers from doors and frames upon delivery at the building site. The contractor responsible for installation shall see that any scratches or disfigurement caused in shipping or handling are promptly sanded smooth, cleaned and touched up with a compatible rust inhibitive primer.
- B. The contractor responsible for installation shall see that materials are properly stored on planks in a dry location. Doors shall be stored in a vertical position and spaced by blocking. Materials shall be covered to protect them from damage but in such a manner as to permit air circulation.

3.02 INSTALLATION

The Contractor responsible for installation shall perform the following in accordance with HMMA 840:

- A. Prior to installation, all frames shall be checked for size, swing, and with temporary spreaders removed, corrected for squareness, alignment, twist and plumbness. Permissible installation tolerances shall not exceed the following:

Squareness:..... ± 1/16" measured on a line, 90 degrees from one jamb, at the upper corner of the other jamb.

Alignment:.....± 1/16" measured on jambs on a horizontal line parallel to the plane of the wall.

Twist:.....± 1/16" measured on jambs on horizontal lines perpendicular to the plane of the wall.

Plumbness:.....± 1/16" measured on the jamb at the floor.

These tolerances provide a guideline for proper installation of hollow metal frames. The cumulative effect of the tolerances at their maximum levels will result in sufficient misalignment to prevent the door from functioning properly. Installers should take care not to create a tolerance buildup. Tolerance buildup occurs when more than one dimension is at or near its maximum tolerance.

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- B. Frame jambs, shall be fully grouted to provide added security protection against battering, wedging, spreading and other means of forcing open the door. Jamb mounted lock preparations, grout guards for hardware preparations, glazing stop screws, and junction boxes are intended to protect hardware mortises, tapped mounting holes, and exposed removable screws from masonry grout of 4" maximum slump consistency which is hand troweled in place. If a light consistency grout (greater than 5" slump when tested in accordance with ASTM C 143) is to be used, special precautions shall be taken in the field by the installation contractor to provide protection from grout.
1. Frames shall not be used as forms for grout or concrete. Grouting of hollow metal frames shall be done in "lifts" or precautions shall be otherwise taken by the contractor to insure that frames are not deformed or damaged by this process.
- C. Proper door clearances shall be maintained in accordance with 2.04 of these specifications, except for special conditions otherwise noted. Where necessary, metal hinge shims, furnished by the contractor responsible for installation, are acceptable to maintain clearances.
- D. Hardware shall be applied in accordance with hardware manufacturer's templates and instructions.
- E. Any grout or other bonding material shall be cleaned off of frames or doors immediately following installation. Hollow metal surfaces shall be kept free of grout, tar, or other bonding material or sealer.
- F. Primed or painted surfaces which have been scratched or otherwise marred during installation (including field welding) and/or cleaning shall promptly be finished smooth, cleaned, treated for maximum paint adhesion and touched up with a rust inhibitive primer.

End of Section

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****SECTION 111930 – SECURITY GLASS AND GLAZING****PART I – GENERAL****1.01 WORK INCLUDES:**

- A. The required security glass & glazing work includes exterior glazing, interior glazing, doors, side lites, and other various interior partitions as required.
- B. Furnish all labor, materials, tools, equipment required to satisfactorily and in compliance with all contract documents, complete the project.

1.02 RELATED DOCUMENTS:

- A. Refer to related sections including, but not limited to:
 - 1. Section 111000 - Security Equipment Contractor
 - 2. Section 111910 - Hollow Metal Security and Commercial
 - 3. Section 111940 - Hardware Security and Commercial

1.03 REFERENCES:

- A. Glass Association of North America (GANA) Glazing Manual, 1997 ed.
- B. ASTM F-1915 Test Standard for Detention Glazing.
- C. ASTM D-1044-94 Test Method for Resistance of Transparent Plastics to surface abrasion.
- D. CPSC 16 CFR Part 1201 Safety Standard for Architectural Glazing materials.
- E. ASTM C-1036 Specification for Flat Glass.
- F. ASTM C-1349-96 Standard Specification for Architectural Flat Glass clad polycarbonate.
- F. ASTM F-1592-01 Standard Test Method for Detention Hollow Metal Vision Systems.
- G. ASTM C-1172 Standard Specification for Laminated Architectural Flat Glass.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****1.04 SUBMITTALS:**

- A. Provide 2 each 12” x 12” square samples of each type of security glazing product to be used on the project.
- B. Provide 2 each of the most recent product data for each security glazing product, including thickness, test performance, (reports may be requested), method of test and cleaning instructions. Manufacturer’s suggested installation recommendations shall also be provided.
- C. Provide a detail showing all caulks, setting blocks, tapes and letters of compatibility for each with the specified glazing material, to the architect for approval prior to commencement of installation.
- D. Warranty: Provide a signed copy of the manufacturer’s warranty for the specified security glazing product.
- E. Any other documentation the manufacturer deems necessary to assure compliance to the specification.

1.05 QUALITY ASSURANCE:

- A. Comply with ASTM F-1915-98 containment test for forced entry performance. Round robin testing is not acceptable.
- B. Comply with Underwriters Lab Test UL-752 for ballistic requirements and supply only “listed” UL products.
- C. Experience Criteria: Manufacturers not prior approved, shall provide evidence of five years experience in manufacturing specified item.
- D. Testing: All specified products shall be tested by a laboratory conforming to ASTM E-699.
- E. Security glazing substitutions: All requests (and submittals) for “approval” as a security glazing material must be made to the architect 30 days prior to bid.
- F. Warranty:

Glass clad polycarbonate: shall be a written warranty from the manufacturer agreeing to provide replacement material, FOB point of manufacture, freight prepaid and allowed, in the event of product failure or defect for a period of 5 years from date of substantial completion. Defect shall be defined as delamination, yellowing or hazing.

Laminated Polycarbonate: shall be a written warranty from the manufacturer agreeing to provide replacement material, FOB point of manufacture, freight prepaid and allowed, in the event of product failure or defect for a period of 7 years from date of substantial completion. Defect shall be defined as delamination, yellowing or hazing.

Air - Gap Units: shall be a written warranty from the manufacturer agreeing to provide replacement material, FOB point of manufacture, freight prepaid and allowed, in the event of product failure or defect for a period of one year from date of substantial completion. Defect shall be defined as edge seal failure, hazing or fogging.

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- G. Comply with glazing recommendations as stated in the “GANA” Glazing Association of North America’s glazing manual, latest edition.
- H. Approved Manufacturers: Products shall be supplied by one of the below listed manufacturers or pre-bid approved qualified manufacturers:
 - 1. Global Security Glazing – Selma, Al. 800-633-2513
 - 2. GE
 - 3. Oldcastle Glass

PART 2 PRODUCTS**2.01 MATERIALS****A. Security Glazing Categories**

- 1. Polycarbonate: Laminated or monolithic polycarbonate shall be extruded, UV stabilized, but when laminated uses various layers of urethane resins. Polycarbonate laminates shall have a flexural strength not less than 13,500 psi: (ASTM D-790,) 180°F continuous service temperature. Products must conform to all applicable IBC building Codes with a CC-1 flammability performance rating.
- 2. Air-Gap Unit: Shall be assembled with laminated or monolithic polycarbonate core as required to meet performance requirements. The polycarbonate core shall be separated from the glass by a ¼” Non-rigid edge system that allows the glass to be replaced if broken. Air-Gap Units are not “insulated” or “IG” Units as test by any industry performance standard.
- 3. Glass Clad polycarbonate: Shall be laminated glass – polycarbonate construction using urethane interlayers. Product supplied must be manufactured to ASTM C-1349. All bullet resistant glass clad polycarbonate are to be “no spall” as defined by UL-752 test procedure.

2.02 SECURITY GLAZING TYPES (Glass Clad Polycarbonate)

- A. Security Glass Type GL1/ SG-1 Basis of design 3/8” Clear Lexgard Global Security Glazing MPC375 or equal. See drawings for detailed description.
- B. Security Glass Type GL2/ SG-2 Basis of design 13/16” Clear Secur-Tem + Poly (2115) Global Security Glazing or equal. See drawings for detailed description.
- C. Security Glass Type GL3/SG-3 (Exterior HM Windows) Basis of design 1 3/8” attack resistant tinted and insulated glass Level III: 1 7/16” nominal tinted insulated security glazing: Exterior Lite- ¼” tinted (Gray, Bronze or Solexia) tempered- Airspace – 3/8”- Inboard Lite- 13/16” clear glass clad polycarbonate (to match glass type GL-2 /SG-2 listed above. Global Security Glazing or equal. See drawings for detailed description.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****2.03 SECURITY GLAZING SEALANTS-MATERIALS**

- A. General: Provide product and materials of the type indicated and approved for use with the specified security glazing products.
- B. Comply with recommendations of the security glazing manufacturer for each type of security glazing material regarding, installation, storage, shelf-life, tooling, and finish.
- C. Compatibility: Use only those products previously tested and approved for use with the specified security glazing materials. It shall be the responsibility of the glazing installer to coordinate such approval to the architect through submittals for silicones, setting blocks, glazing tape, and edge blocks.
- D. Provide sealants of a color as indicated by the architect.
- E. Materials:
 - 1. Silicone sealants shall be single component elastomeric silicone that complies with FSTT-S-001543, Class A, nonsag, ASTM C-920 Type S, Grade NS class 25. Use G for high modulus silicone. Dow Corning 795 or GE Silpruf SC2000 as determined acceptable by the Architect. Color: black or as identified on the drawings.
 - 2. Glazing tapes shall be 1/8" x 1/2" preformed butyl tape, 100% solids, Tremco 440 or approved equal. Shimmed or unshimmed as needed.
 - 3. Blocking shall be EPDM, Neoprene, silicone or thermoset rubber as tested to be compatible with the specified security glazing product.
 - 4. Setting blocks are to be 80-90 shore A durometer, 1/4" thick.
 - 5. Edge blocks are to be 70-80 shore A durometer, 1/8" thick.
 - 6. Primers, cleaners, sealers shall be supplied per the manufacturer recommendations for compatibility as required.

PART 3 – EXECUTION**3.01 PRE-INSTALLATION**

- A. Inspection: Prior to installation, the glazier shall inspect all hollow metal frames for compliance to specifications, including size, squareness, edge clearance, weep holes, weld splatter and any other conditions detrimental to the installer's successful completion of the install. Any such conditions shall be brought to the attention of the architect and general contractor with all such conditions corrected prior to commencement of installation.
- B. Clean all glazing channels immediately prior to installation.
- C. Confirm sizes of all glass; the use of field measurements for ordering glass shall be at the discretion of the installer.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT**3.02 INSTALLATION

- A. Security glazing installation and fabrication shall comply with the written recommendations of the manufacturer.
- B. In stall security glazing as late as possible in the construction of the facility. All polycarbonate glazing shall have its masking removed only for approximately 1-2” from the edge so as to allow installation.
- C. All polycarbonate glazing exposed to direct sunlight shall have it’s masking entirely removed, recovered with plastic poly/duct tape to the frames. Failure to remove polycarbonate masking when in direct sunlight may cause staining or “shadows” later.
- D. Silicone cap beads shall be required on all exterior glazing tape and all lites (either interior or exterior) in direct contact with inmates.
- E. Proper coordination of cleaning the security glazing shall be the sole responsibility of the General Contractor. It is highly recommended that a meeting of related trades; installer, glazing manufacturer, painter, GC be conducted to assure glazing is not damaged by subsequent trades.

End of Section

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****SECTION 111940 – HARDWARE (Security & Commercial)****I. GENERAL****1.01 WORK INCLUDED**

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. The work covered by this section of the Specification consists in furnishing all labor, materials, and equipment, required to furnish and deliver to the jobsite, all finishing hardware, except as otherwise specified. Work shall be complete, and in strict accordance with this section of the Specification and the applicable drawings, and subject to the terms and conditions of the Contract, including, but not limited to the following:
 - 1. Finishing Hardware - Commercial & Security
- C. Security Equipment Contractor: Furnish and install security and commercial hardware, as indicated in Section 111000.
- D. Coordinate with door schedule and door details:
 - Hollow Metal - Section 111910
- E. Coordinate security hardware installation with the electrical requirements provided by the electronic security system contractor.
- F. General Contractor: Coordinate installation of hardware with security contractor, electronic security system contractor, and the electrical contractor.

1.02 RELATED WORK

- A. Hardware for the following items specified under other sections of the Specifications:
 - 1. Window and Metal Casework Hardware
 - 2. Roll-Up Door Hardware (Except Items Listed Herein)
 - 3. Chain Link Gates (Except Items Listed Herein)
 - 4. Refrigeration Door Hardware
 - 5. Metal Stair Nosings
 - 6. Closet Shelves, Brackets and Rods
- B. Specified elsewhere:
 - 1. Section 111000 – Security Equipment Contractor
 - 2. Section 111910 – Hollow Metal (Security & Commercial)
 - 3. Section 111930 – Security Glass and Glazing

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****1.03 QUALITY ASSURANCE**

- A. The security equipment contractor shall provide all material, as described in Sections 111910, 111930, and 111940, as well as coordinate this equipment with his manufacturers, fabricators, installers, and with work by others.
- B. Manufacturer's Qualifications - Manufacturer of security hardware shall be a nationally recognized firm, specializing in the design and manufacture of this type of equipment, for a period of not less than ten (10) years.
- C. The quality of all items of hardware has been clearly indicated by the manufacturer's name and/or number. Certain products are specified without substitution, and shall be furnished exactly as specified. Requests for substitutions must be in writing, and received by the Architect, at least two (2) weeks before the bid date. The acceptance of any substitution will be by addendum.
- D. The security equipment contractor must have, full time in its employ, an Architectural Hardware Consultant, as certified by The Door and Hardware Institute, who is available during the course of the project, for consultations with the Owner, Architect, and Contractor.
- E. Bids will only be accepted by pre-approved security equipment contractors, as listed in Section 111900.

1.04 REFERENCES

- A. The following publications are reference standards:
 - NFPA 80 Fire Doors and Windows
 - NFPA 101 Life Safety Code
 - ANSI A156 American National Standards Institute
- B. Where Underwriters Labeled openings are required, all the finishing hardware shall be furnished in strict accordance with the requirements of the applicable code authorities, Underwriters Laboratories, NFPA 80 Fire Doors and Windows, and NFPA 101 Life Safety Code.

1.05 SUBMITTALS

- A. Before any materials are released for ordering, the finishing hardware supplier shall submit, to the Architect or approval, eight (8) copies of the full and complete Finishing Hardware Schedule, covering all items required for the entire project. This schedule shall be submitted within twenty-eight (28) days of receipt of the Purchase Order. The Finish Hardware Schedule shall clearly indicate the swing, location, number, size, and thickness of each door; as well as type, number, and finish for each item of hardware required. Doors with different size, material, or hardware shall be listed in different hardware sets. The Finishing Hardware Schedule shall follow the guidelines and format as set forth in the D.H.I. publication "Scheduling Sequence and Scheduling Format". Required in the Finishing Hardware Schedule is a door index, listing each opening by door number, with the corresponding page and heading number. Also required shall be a bibliography, listing the types of hardware supplied, and the corresponding manufacturer's name. Approval of the Finishing Hardware Schedule will not relieve the hardware supplier of responsibility for errors or omissions, which it may contain.

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- B. Only one (1) schedule, for both security and commercial hardware, shall be submitted.
- C. Hardware schedules shall be vertical type. Horizontal format hardware schedules will not be accepted.
- D. Samples showing function, design, and finish of proposed hardware items shall be submitted to the Architect, upon request. All hardware samples remain the property of the hardware supplier, and shall be returned before the completion of the project.
- E. All items of hardware to be installed on doors and/or frames shall be made to template. One (1) copy of all necessary templates, as well as a list of all items and their appropriate template number, is to be sent to each of the following manufacturers, within forty-eight (48) hours after receipt of the approved Finishing Hardware Schedule:
 - 1. Wood Door Manufacturer
 - 2. Hollow Metal Manufacturer
 - 3. Aluminum Door Manufacturer

The submission of templates and template list shall follow the procedure as set forth in the D.H.I. publication "For Processing Hardware Schedules and Templates".

- F. Two (2) complete sets of catalog cuts shall be required to accompany the Finish Hardware Schedule upon submission. The list of cuts shall include the items, manufacturer, and the item number.
- G. The hardware schedule must be prepared by a certified Architectural Hardware Consultant (AHC).
- H. The successful security equipment contractor shall meet with the Owner, Architect, and General Contractor, to Review the shop drawings per section 111900.
- I. The successful security equipment contractor is required to meet with the Owner and/or Architect, to establish the keying requirements. A detailed Keying Schedule shall be submitted to the Owner and approved in writing prior to ordering locksets.
- J. Maintenance Manual -- Submit a bound, complete maintenance and spare parts manual with drawings, for all security and electro-mechanical products supplied in this section. Provide on-site review of this manual with the Owner's designated representative(s); allow one (1) - eight (8) hour day scheduled, at Owner's convenience.

1.06 DELIVERY, STORAGE & HANDLING

- A. All finishing hardware shall be in sufficient quantities to fulfill the requirements of the contract drawings and all conditions, as set forth in this section of the Specification.
- B. The successful security equipment contractor shall coordinate the finishing hardware with all other related trades, such as the hollow metal manufacturer, wood door manufacturer, and aluminum door manufacturer. These related trades shall supply the necessary shop drawings to the hardware supplier, upon request.

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- C. All hardware shall be in its original package, properly wrapped, with the correct screws, bolts and fastenings, and shall be clearly marked for location, with item and door numbers corresponding to the Finish Hardware Schedule. Each item shall contain the necessary templates and instructions for installation.
- D. All hardware shall be delivered to the jobsite properly wrapped and marked, as set forth above. A locked room shall be set aside for the storage of the finishing hardware. This room shall be clean and dry, and have shelves, for the sole purpose of receipt and storage of the finishing hardware. Hardware shall be delivered to the jobsite by employees of the hardware supplier. No drop shipments will be permitted. Upon delivery, the General Contractor and the hardware supplier shall check the hardware against the Finishing Hardware Schedule, and place the items on the provided shelves. After delivery, the General Contractor shall be responsible for the hardware, against all losses, damages, etc.
- E. A final inspection is to be made by the hardware supplier, to certify that all hardware was installed properly, according to the manufacturer's instructions.

1.07 JOB CONDITIONS

- A. Finish/Security Hardware Coordinator Conference - A coordination conference will be held, coordinated by the General Contractor, after submittal of the schedules and shop drawings.
- B. Participants - A qualified representative of each of the following parties shall attend the conference:
 - 1. General Contractor
 - 2. Electrical Contractor
 - 3. Electronic Security System Contractor
 - 4. Security Equipment Contractor
 - 5. Architect
- C. This meeting is in addition to the shop drawing review meeting listed in section 111900.

1.08 WARRANTY

- A. All hardware shall be free of defects and imperfections in manufacture and finish. The finishing hardware shall be guaranteed by the manufacturer to perform all the various functions required, for a period of one (1) year after the acceptance of the building by the Owner. All work and material is subject to the general guarantee, as listed in the "General Requirements" section of this Specification.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****II. PRODUCTS****2.01 GENERAL**

- A. Hardware specified herein is intended to cover all of the necessary material required, to fully complete the hardware requirements for the specified openings. It is the intention that the hardware specified shall be figured in sufficient quantities to fill the requirements of the contract drawings, although every item necessary to do so may not be specified herein, except those items of hardware that are specifically covered under other sections of the Specification.
- B. If hardware for any particular location is not specified herein, it shall be furnished of similar design, and quality equal to other terms specified for similar locations. It shall be of suitable type and ample size and weight to perform the services required.
- C. It is the intent that hardware be furnished and installed so that it meets barrier-free facilities standards of the State of Delaware, where applicable. Note especially the following:
1. Lever Heights
 2. Knurled Levers
 3. Closer Opening Force
 4. Push & Pull Plate Height
- D. **All screws shall be torx security, with center pin, on detention and commercial doors.**

2.02 ACCEPTABLE MANUFACTURERS

- A. Items listed herein are taken from the following manufacturer's catalogs:
1. Folger Adam (FA) Southern Steel (SS) **No Substitution to match existing locks**
 2. LCN Closers (LCN) **No Substitution to match existing closers**
 3. Trimco (TR)
 4. Architectural Builders Hardware (ABH)
 5. Rockwood (R)
 6. National Guard Products (NG)
 7. Stanley (ST)
 8. Corbin
 9. Rixson
 10. Pemko

2.03 HARDWARE FINISH

- A. The finishes of products shall be as listed in the hardware sets.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****2.04 MATERIALS**

- A. All hinges shall be stainless steel. All hinges shall have non-removable pins. Doors up to and including 90" shall have three (3) hinges per leaf. Doors over 90", up to and including 120", shall have four (4) hinges per leaf. Hinges of same weight, size, and finish as listed in the hardware sets, are acceptable from Folger Adam, Southern Steel and Stanley, as follows:

<u>Folger Adam</u>	<u>Southern Steel</u>	<u>Stanley</u>
4-1/2 FM-ICS	204FMSS	IHTCB1995 TORX

- B. Security mortise locks shall be Series LTD9300 as manufactured by Southern Folger. **No Substitution Allowed.**
- C. Detention and Commercial door closers shall be series 4210-CUSH, 4210, or 4510 as manufactured by LCN. **No Substitution Allowed.** All screws shall be torx security type. All closers (both commercial & detention) shall be security type as listed above by one manufacturer.
- D. Kickplates shall be Rockwood .050, with four (4) sides beveled (B4E) and countersunk screws (CSK). Height of kickplates are as listed in the sets. Width of plates is 1" less door width on pairs of doors, and 2" less door width on single doors. All screws are to be torx security type. Comparable manufacturers Trimco & Burns are acceptable.
- E1. Security door stops shall be 467 as manufactured by Rockwood. Stanley and Southern Steel are acceptable.
- E2. Overhead stops and holders shall be Series 1000, as manufactured by ABH. Sex nuts and bolts are to be furnished with all surface overhead stops and holders. Finish must be stainless steel. All screws are to be security torx type. Rixson and Corbin are acceptable
- F. All single door openings are to receive three (3) silencers on strike jamb, and all pairs of doors are to receive two (2) silencers on the head jamb. Silencers shall be number 608 on hollow metal jambs, as manufactured by Rockwood. Exclude silencers on jambs with gasketing, and exterior. Comparable manufacturer Burns and Trimco are acceptable.
- G. Security Corridor Sliding Door Operators shall be Southern Steel 3165LX.b for 3'6" or wider door. Folger Adam corridor slider D3B.2 is acceptable.
- H. Weatherstripping and thresholds listed are manufactured by National Guard Products. All screws are to be security torx type on detention doors. Zero and Pemko is acceptable.
- I. Mechanical detention deadlock shall be series 10 as manufactured by Folger Adam. Series 1010 as manufactured by Southern Steel is acceptable.
- J. Electric detention locks shall be series 120E as manufactured by Folger Adam. Series 10120AE as manufactured by Southern Steel is acceptable.

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- K. Door position switch shall be model 200MRS-TB, as manufactured by Southern Folger Company. Detex 2049F is acceptable if triple biased. All screws are to be security torx type.
- L. Door pulls shall be model #2 x 32D, and flush pulls model #4 x 32D as manufactured by Folger Adam. Model 212C x 26D, and 214S x 26D as manufactured by Southern Steel is acceptable

2.05 KEYING REQUIREMENTS

- A. All locks shall be set to the existing key system, with all keying information kept on record at the factory. Three Systems required. High Security Builders Cylinders, Mogul Cylinders and Paracentric Cylinders. (Corridor Sliding Doors and Access Doors)
- B. Furnish two (2) keys with each cylinder. All keys to be nickel-silver factory original keys.
- C. All locks shall have visual key control, with keying symbol stamped on key.
- D. All keys are to be delivered, via registered mail, to the designated representative at JTVCC

III. EXECUTION**3.01 INSPECTION**

- A. After installation has been completed, the finish hardware supplier shall have a qualified hardware consultant check the job, and do a final inspection, to determine that the doors and frames were prepared properly to receive the hardware. The inspection shall also determine that the proper hardware was used on each opening, according to the approved Finishing Hardware Schedule.
- B. The final inspection shall determine that all hardware was installed according to the manufacturer's recommended instructions. Any hardware that is not operating properly shall be adjusted at this time.

3.02 INSTALLATION

- A. The mounting heights for the finishing hardware shall be as listed in the D.H.I. publication "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames".
- B. The handing of doors shall be as listed in the Finishing Hardware Schedule, and shall follow the D.H.I. publication "Basic Builders' Hardware"C". The finish hardware installer shall be skilled and qualified in the installation of contract builders' hardware.

3.03 ADJUSTING AND CLEANING

- A. All hardware shall be left clean, and free from disfigurement at final completion. The Contractor shall make final adjustments to all door closers and other hardware items. Defective or damaged items shall be repaired or replaced.

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****3.04 PROTECTION**

- A. The General Contractor is responsible to provide proper protection for the hardware and finish, until the Owner accepts the project.

3.05 DEFECTIVE WORK

- A. Where security hardware is found defective, in materials or installation; re-work, restore, replace, or otherwise correct, as directed.
- B. The following will be considered as defective work:
1. Unauthorized Substitutions
 2. Items Delivered with Missing, Broken, Damaged, or Defaced Parts
 3. Items of Incorrect Hand or Function
 4. Items Broken, Damaged, or Defaced After Delivery
 5. Items Incomplete, Misaligned, or Incorrectly Located
- C. All expenses incurred in trouble-shooting security hardware problems caused by inadequate workmanship on the part of a sub-contractor, shall be borne by the sub-contractor.

3.06 HARDWARE SETS**SET #S1**

Doors: 111, 112, 113, 114, 115,

Each to Have:

SS/FA	3ea	Security Hinges	204 FM-ICS	US32D
SS/FA	1ea	Classroom Lock	LTD9305	US32D
LCN	1ea	Security Closer/Stop	4211CUSH	ALUM
R	1ea	Kick Plate	K1050 10" x 2" LDW .050 B4E CSK TORX	US32D
R	3ea	Silencers	608	GRAY

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****SET #S2**

Doors: 101

Each to Have:

SS/FA	3ea	Security Hinges	4 ½" FM-ICS	US32D
SS/FA	1ea	Electric Lock	126E-1-01 NFS 120VAC KCE (8 ¾")	US32D
SS/FA	1ea	Door Position Switch	200MRS-TB	GALV
SS/FA	2ea	Surface Pulls	#2 or 212C	US32D
LCN	1ea	Security Closer/Stop	4211CUSH	ALUM
R	1ea	Kick Plate	K1050 10" x 2" LDW .050 B4E CSK TORX	US32D
R	3ea	Silencers	608	GRAY

SET #S3

Doors: 110A, 110C, 110D (Corridor Sliding Door Operators)

Each to Have:

SS/FA	1ea	Sliding Door Operator	3165LX.b or D3B.2	USP
SS/FA	2ea	Pulls as Required	#2, #4 or 212C, 214S	US26D

SET #S4

NOT USED

SET #S5

Doors: 102, 102A, 102B, 103, (Various Rooms)

Each to Have:

SS/FA	3ea	Security Hinges	4 ½" FM-ICS	US32D
SS/FA	1ea	Storeroom Lock	LTD9362	US32D
LCN	1ea	Security Closer	4211CUSH, 4211, 4511 (as required)	ALUM
R	1ea	Kick Plate	K1050 10" x 2" LDW .050 B4E CSK TORX	US32D
TR	3ea	Silencers	1229A (as required)	GRAY

JTVCC BUILDING 20 EXPANSION**DIVISION OF FACILITIES MANAGEMENT****SET # S6**

Doors: 104 (Inmate Toilet)

Each to Have:

SS/FA	3ea	Security Hinges	4 ½" FM-ICS	US32D
SS/FA	1ea	Keyed Privacy Lock	LTD9362	US32D
LCN	1ea	Security Closer/Stop	4211CUSH	ALUM
R	3ea	Silencers	608	GRAY

SET # S7

Doors: Access Doors: AD01

Each to Have:

SS/FA	3ea	Security Hinges	204FM-ICS	US32D
SS/FA	1ea	Deadlock	10 Series x HM Mntg. x #1Esc (US32D	GALV
SS/FA	1ea	Surface Pull	#2 or 212C	US26D
R	1ea	Security Stop	467	BLACK
R	3ea	Silencers	608	GRAY

Note: This deadlock is to be keyed both sides**End of Section**

**SECTION 23 31 01
FABRIC DUCTWORK**

PART 1 - GENERAL**1.01 DESCRIPTION OF WORK:**

- A. Extent of non-metal ductwork is indicated on drawings and by requirements of this section.
- B. Types of non-metal ductwork required for this project include the following:
 - 1. Fabric Air Dispersion Products.

1.02 QUALITY ASSURANCE:

- A. Building Codes and Standards:
 - 1. Product must be Classified by Underwriter's Laboratories in accordance with the 25/50 flame spread / smoke developed requirements of NFPA 90-A and are also classified in accordance with ICC Evaluation Service AC167.
 - 2. All product sections must be labeled with the logo and classification marking of Underwriter's Laboratories.
- B. Design & Quality Control
 - 1. Manufacturer must have documented design support information including duct sizing, vent and orifice location, vent and orifice sizing, length, and suspension. Parameters for design, including maximum air temperature, velocity, pressure and fabric permeability, shall be considered and documented.

1.03 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications on materials and manufactured products used for work of this section.
- B. Building Code Data: Submit UL file number under which product is Classified by Underwriter's Laboratories.

1.04 WARRANTY

- A. Manufacturer must provide a 5 Year Product Warranty for products supplied for the fabric portion of this system as well as a Design and Performance Warranty.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Protect fabric air dispersion systems from damage during shipping, storage and handling.
- B. Where possible, store products inside and protect from weather. Where necessary to store outside, store above grade and enclose with a vented waterproof wrapping.

PART 2 - PRODUCTS**2.01 MANUFACTURER:**

- A. Subject to compliance with requirements, choose one of the following:
 - 1. DuctSox® Corporation
 - 2. KE Fibertec
 - 3. FabricAir. Inc
 - 4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FABRIC AIR DISPERSION SYSTEM:

- A. Fabric: Air diffusers shall be constructed of a woven fire retardant fabric complying with the following physical characteristics:
 - 1. Fabric Construction: 100% Flame Retardant
 - 2. Weight: 7.67 oz./yd² per ASTM D3776
 - 3. Color: (red, white, blue, green, gray, tan or black) provide sample with submittals for owner to select.
 - 4. Fabric Porosity: 1.5 (+2/-1) cfm/ft² per ASTM D737, Frazier
 - 5. Temperature Range: 0 degrees F to 180 degrees F

6. Fire Retardancy: Classified by Underwriters Laboratories in accordance with the requirements of NFPA 90-A and AC-167 (noted above).

2.03 SYSTEMS FABRICATION REQUIREMENTS:

- A. Air dispersion accomplished by linear vent and permeable fabric. Linear vent is to consist of an array of open orifices rather than a mesh style vent to reduce maintenance requirements of mesh style vents. Linear vents should also be designed to minimize dusting on fabric surface.
- B. Size of and location of linear vents to be specified and approved by manufacturer.
- C. Inlet connection to metal duct via fabric draw band with anchor patches as supplied by manufacturer. Anchor patches to be secured to metal duct via zip screw fastener - supplied by contractor.
- D. Inlet connection includes zipper for easy removal / maintenance.
- E. Lengths to include required zippers as specified by manufacturer.
- F. System to include Adjustable Flow Devices to balance turbulence, airflow and distribution as needed. Flow restriction device shall include ability to adjust the airflow resistance from 0.06 - 0.60 in w.g. static pressure.
- G. Fabric system shall include connectors to accommodate suspension system listed below.
- H. Any deviation from a straight run shall be made using a gored elbow or an efficiency tee. Normal 90 degree elbows are 5 gores and the radius of the elbow is 1.5 times the diameter of the fabric ductwork.

2.04 DESIGN PARAMETERS:

- A. Fabric air diffusers shall be designed from 0.25" water gage minimum to 3.0" maximum, with 0.5" as the standard.
- B. Fabric air diffusers shall be limited to design temperatures between 0 degrees F and 180 degrees F (-17.8 degrees C and 82 degrees C).
- C. Design CFM, static pressure and diffuser length shall be designed or approved by the manufacturer.
- D. Do not use fabric diffusers in concealed locations.
- E. Use fabric diffusers only for positive pressure air distribution components of the mechanical ventilation system.

2.05 SUSPENSION HARDWARE: (INCLUDE APPLICABLE COMPONENTS ONLY)

- A. Suspended H-Track: System shall include a double (2 Row) runs of aluminum H-Track system located 1.5" above the 10 and 2 o'clock (2 Row) locations of fabric duct system. Hardware to include 10' sections of track, splice connectors, track endcaps and vertical cable support kits - consisting of a length of cable with a locking stud end and Gripple quick cable connectors. Radius aluminum track must be included for all radius sections.
 1. Fabric / Track attachment
 - a. Cord In continuous supporting cord (not suggested for systems >24" Dia.)
 - b. Snap Tabs are a detachable sliding tab positioned every 24" along the length of the system (all diameters).
 - 1) Hardware components
 - 2) Provide 316 Stainless Steel components including coupler assembly, vertical cable support and Gripple quick cable connector.
- B. If a single H-Track system is installed the hanger must connect to the fabric duct system in at least 2 points to maintain shape while the duct is de-flated.

PART 3 - INSTALLATION

3.01 INSTALLATION OF FABRIC AIR DISPERSION SYSTEM:

- A. Install chosen suspension system in accordance with the requirements of the manufacturer. Instructions for installation shall be provided by the manufacturer with product.

3.02 CLEANING AND PROTECTION:

- A. Clean air handling unit and ductwork prior to the fabric duct system unit-by-unit as it is installed. Clean external surfaces of foreign substance which may cause corrosive deterioration of facing.
- B. Temporary Closure: At ends of ducts which are not connected to equipment or distribution devices at time of ductwork installation, cover with polyethylene film or other covering which will keep the system clean until installation is completed.
- C. If fabric duct systems become soiled during installation, they should be removed and cleaned following the manufacturers standard terms of laundry.

END OF SECTION 23 31 01

SECTION 23 33 19
DUCT SILENCERS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Duct silencers.
- B. Acoustic housings.
- C. Acoustic louvers.

1.02 RELATED REQUIREMENTS

- A. Section 23 31 00 - HVAC Ducts and Casings: Connections to silencers.
- B. Section 23 33 00 - Air Duct Accessories: Flexible duct connections.

1.03 REFERENCE STANDARDS

- A. ANSI/ASA S1.4 PART 3 - American National Standard Specification for Electroacoustics - Sound Level Meters - Part 3: Periodic Tests; 2014.
- B. ASHRAE Std 62.1 - Laboratory Method of Testing to Determine the Sound Power in a Duct; 2013.
- C. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. NEBB (STDS) - Procedural Standard for Measurement of Sound and Vibration; 2015, with Errata (2017).
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance.
- C. Shop Drawings: Indicate assembly, materials, thicknesses, dimensional data, pressure losses, acoustical performance, layout, and connection details.
- D. Test Reports: Indicate dynamic insertion loss and noise generation values of silencers.
- E. Manufacturer's Installation Instructions: Indicate installation procedures necessary to maintain integrity of sound isolation.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in State of Delaware OMB - Department of Corrections's name and registered with manufacturer.
- G. Project Record Documents: Record actual locations of acoustic housings.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Design application of duct silencers under direct supervision of a Professional Engineer experienced in design of this work.

PART 2 PRODUCTS**2.01 DUCT SILENCERS**

- A. Manufacturers:
 - 1. Price Industries, Inc: www.priceindustries.com.
 - 2. Vibro-Acoustics.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Description: Duct section with sheet metal outer casing, sound absorbing fill material, and inner casing of perforated sheet metal; incorporating interior baffles of similar construction. Fabricate in accordance with SMACNA (DCS) HVAC Duct Construction Standards.
- C. General Requirements:
 - 1. Casing, sealants, adhesives, accessory materials, and packing materials to comply with ASTM E84.
 - 2. Airstream surfaces installed in a return air plenum to comply with requirements in ASHRAE Std 62.1.
 - 3. Factory-fabricated, field-installed products.
- D. Materials:
 - 1. Outer Casing: Minimum 22 gage, 0.0299 inch thick galvanized steel stiffened as required, with mastic filled lock formed seams, 2 inch long, 11 gage, 0.1196 inch slip joints on both ends.
 - 2. Inner Casing and Splitters: Minimum 24 gage, 0.0239 thick perforated galvanized steel.
 - 3. Fill: Glass fiber or mineral wool of minimum 4 lb/cu ft density.
 - 4. Fill Liner: Mylar film.

2.02 ACOUSTIC HOUSINGS

- A. Manufacturers:
 - 1. Price Industries, Inc; _____: www.priceindustries.com.
 - 2. Vibro-Acoustics.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Description: Modular panels, including access doors and windows, nominal 4 inches thick, with filled outer and inner casing. Fabricate and support in accordance with SMACNA (DCS) HVAC Duct Construction Standards.
- C. Materials:
 - 1. Outer Casing: Minimum 18 gage, 0.0478 inch thick galvanized steel stiffened as required, with mastic filled lock formed seams for internal flange butt joining.
 - 2. Inner Casing and Splitters: Minimum 22 gage, 0.0299 inch thick perforated galvanized steel.
 - 3. Fill: Glass fiber or mineral wool of minimum 4 lb/cu ft density.
 - 4. Fill Liner: Mylar film.

2.03 DUCTWORK LAGGING

2.04 ACOUSTIC LOUVERS

2.05 PERFORMANCE REQUIREMENTS

- A. Use acoustical devices to maintain sound level of spaces at levels not to exceed those listed below.
- B. Maintain rooms at the following maximum sound levels, in Room Criteria (RC) as defined by ASHRAE (HVACA) Handbook - HVAC Applications.
 - 1. Schools:
 - a. Open-Plan Classrooms: 30.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Support duct silencers independent of ducts with flexible duct connections, lagged with leaded vinyl sheet on inlet and outlet. Refer to Section 23 31 00 and Section 23 33 00.
- C. Where indicated, lag ductwork by wrapping with insulation and covering. Apply covering to be air tight. Do not attach covering rigidly to ductwork.
- D. Attach ductwork to acoustic louvers with flexible duct connections. Refer to Section 23 33 00.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Provide services of an independent testing agency to take noise measurements in accordance with provisions of NEBB (STDS). Use meters meeting requirements of ANSI/ASA S1.4 PART 3.
- C. After start-up, final corrections and balancing of systems take octave band sound measurements over full audio frequency range in areas adjacent to mechanical equipment rooms, duct and pipe shafts, and other critical locations, as directed.
- D. Provide one-third octave band measurements of artificial sound sources in areas indicated as having critical requirements.
- E. Submit complete report of test results including sound curves.

3.03 SYSTEMS STARTUP

- A. Inspect installation periodically. Prepare and start systems.

END OF SECTION 23 33 19

SECTION 23 74 13**PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Packaged roof top unit.
- B. Unit controls.
- C. Roof mounting curb and base.

1.02 RELATED REQUIREMENTS

- A. Section 23 40 00 - HVAC Air Cleaning Devices.
- B. Section 26 27 17 - Equipment Wiring: Installation and wiring of thermostats and other controls components; wiring from unit terminal strip to remote panel.

1.03 REFERENCE STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008.
- B. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2008.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- C. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- D. Controls Documentation: This equipment is to be integrated into an existing BAS. All of the BACnet points available shall be provided with the unit submittal. These points shall be defined as read/write or read only points. This documentation will also be provided to the Controls subcontractor for integration purposes. In addition to the BACnet point's the manufacturer's pre-determined control sequence shall be provided with the unit submittal.
- E. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
- F. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in State of Delaware OMB - Department of Corrections's name and registered with manufacturer.
- H. Maintenance Materials: Furnish the following for State of Delaware OMB - Department of Corrections's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Filters: Two sets for each unit.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Basis of Design : Lennox Industries: www.lennoxindustries.com
- B. Carrier: www.carrier.com.
- C. Trane, a brand of Ingersoll Rand: www.trane.com.
- D. York International Corporation/Johnson Controls Inc: www.johnsoncontrols.com.
- E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MANUFACTURED UNITS

- A. General: Roof mounted units having gas burner and electric refrigeration. This particular unit shall be mounted at grade on a custom curb and shall be fitted with a short cycle air flow damper.
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat exchanger and burner, hot gas re-heat coil, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
- D. Disconnect Switch: Factory mount disconnect switch in control panel.

2.03 FABRICATION

- A. Cabinet: Steel with baked enamel finish, including access doors with piano hinges and locking handle. Structural members shall be minimum 18 gage, 0.0478 inch, with access doors or panels of minimum 20 gage, 0.0359 inch.
- B. Insulation: one inch thick neoprene coated glass fiber with edges protected from erosion.
- C. Heat Exchangers: Stainless steel, of welded construction.
- D. Supply Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch motor pulley, and rubber isolated hinge mounted high efficiency motor. Isolate complete fan assembly. Refer to Section 22 05 48.
- E. Air Filters:
 - 1. 2 inch thick glass fiber disposable media in metal frames.
- F. Roof Mounting Curb: 14 inches high galvanized steel, channel frame with gaskets, nailer strips.

2.04 COOLING SYSTEM

- A. Refrigerant type: R-410A.
- B. Capable of operating from 0 - 125 degrees F (-18 - 52 degrees C) without installation of additional controls.
- C. Compressors:
 - 1. Two stage Scroll compressor on 3 thru 5 ton units for increased part load efficiency. Single stage scroll compressors on all other models.
 - 2. Resiliently mounted on rubber mounts for vibration isolation.
 - 3. Overload Protected

4. Internal excessive current and temperature protection
 5. Isolated from condenser and evaporator fan air streams
 6. Refrigerant cooled
- D. TXV with removable element head on each circuit
 - E. High pressure switch on each circuit
 - F. Freezestat on each circuit
 - G. High capacity filter driers on each circuit
 - H. Crankcase heater on each compressor
 - I. Low pressure switch on each circuit

2.05 COIL CONSTRUCTION

- A. Condensing/evaporator coil general construction:
 1. Aluminum Rippled and Lanced fins.
 2. Copper tube construction.
 3. Aluminum fins mechanically bonded to copper tubes.
 4. All coils are high pressure leak tested at manufacturing facility.
- B. Evaporator Coils:
 1. With balanced port thermal expansion valves, freeze protection on each compressor circuit, pressure and leak tested to 500 psi.
 2. Evaporator coil shall be of the split face type with each compressor circuit on coil divided across face of coil and active through full depth of coil.
- C. Condenser Coils:
 1. Units to utilize formed condenser coils.

2.06 BURNER

- A. Gas Burner: Induced draft type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off pilot.
- B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow proven and slight delay, allow gas valve to open.
- C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.
- D. Field Installed Accessories:
 1. Provide Combustion Air Intake Extensions

2.07 OPERATING CONTROLS

- A. Temperature transmitter located in supply air shall signal electronic logic panel to control mixing dampers and cooling in sequence. Mixing section shall operate as first stage of cooling and revert to minimum outside air above approximately 75 degrees F as determined by enthalpy of return and outdoor air.
- B. Control cooling by cycling compressors, cylinder unloading, and hot gas bypass.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.
- B. Verify that proper power supply is available.

3.02 INSTALLATION

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

- B. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.03 SYSTEM STARTUP

- A. A certified manufacturer's representative shall prepare and start equipment. This representative shall verify the controls points with the controls subcontractor, that the unit is operating on the proper manufacturer's sequence of operation, and make any adjustments for proper operation.
- B. The certified manufacturer's representative shall fill out a start-up check list and submit the completed list to the Architect / Engineer for review.

3.04 CLOSEOUT ACTIVITIES

- A. Demonstrate operation to State of Delaware OMB - Department of Corrections's maintenance personnel.
- B. Prior to Demonstration this equipment shall be tested for a period of 1 week minimum. At the end of the test period the certified manufacturer's representative shall return to the job site and examine the unit's performance. This visit shall be coordinated with the design engineer and owner representative. Both the design engineer and owner must witness this performance test as part of the closeout activities.
- C. Change of season adjustments: The owners representative shall be responsible to make unit adjustments 6 months after Demonstration has been performed. These adjustments shall be witnessed by the owner's representative and another start-up checklist shall be filled out and sent to the engineer.

END OF SECTION 23 74 13

DRAWINGS REDACTED