



R G Architects, LLC

200 West Main Street
Middletown, DE 19709
302.376.8100
302.376.9851 fax
www.rgarchitects.net

RGA No.15049
20 February 2017

ADDENDUM NO. 2

STATE OF DELAWARE OMB/DFM
DOC – HRYCI Old Kitchen / Medical Area Renovations
1301 East 12th. Street
Wilmington, DE 19801

R G Architects
200 West Main Street
Middletown, DE 19709
Phone: 302-376-8100 (phone)
Fax: 302-376-9851 (fax)
Email: jim@rgarchitects.net

BIDS DUE:

Tuesday, March 7, 2017 at 2:30 p.m.

LOCATION:

**THOMAS COLLINS BUILDING
Division of Facilities Management Office
540 S. DuPont Highway, Suite 1 (Third Floor)
Dover, Delaware 19901
Attn: Dean Seely**

NOTICE TO ALL BIDDERS

1.0 GENERAL NOTES:

- 1.1 Bidders are hereby notified that this Addendum shall be and hereby becomes part of their Contract Documents, and shall be attached to the Project Manual for this project.
- 1.2 The following items are intended to revise and clarify the Drawings and Project Manual, and shall be included by the Bidder in their proposal.
- 1.3 Bidders shall verify that their Sub-bidders are in full receipt of the information contained herein.
- 1.4 All addenda will be sent out to the registered plan holders via email. Contractors are encouraged to keep an eye on their email accounts during the bidding period for such updates.
- 1.5 **As mentioned at the prebid meeting, a “Detention Equipment Contractor” or DEC, is a required subcontractor to this bid. As such they have been added to the Subcontractors list in the bid form. Qualified Detention Equipment Contractors are to meet the requirements of the attached 11 10 00 DETENTION EQUIPMENT CONTRACTOR specification. Note: If Bidders are proposing to utilize a Detention Equipment Contractor not listed as an approved DEC, the proposed DEC’s Quality Assurance information shall be submitted immediately after the General Contractor is notified as the apparent low responsible bidder, per specification requirements.**

2.0 Revisions to the SPECIFICATIONS

- 2.1 00 41 13 BID FORM – Revised Subcontractors List
- 2.2 11 10 00 DETENTION EQUIPMENT CONTRACTOR – See attached revised detention equipment contractor specification.
- 2.3 11 19 10 HOLLOW METAL (Security Commercial) – See attached revised detention equipment contractor specification.

3.0 Revisions to the DRAWINGS

- 3.1 None at this time.

4.0 Questions

- 4.1 None at this time.

5.0 ATTACHMENT LIST:

- A. Subcontractors List
- B. 11 10 00 DETENTION EQUIPMENT CONTRACTOR
- C. 11 19 10 HOLLOW METAL (Security Commercial)

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work**. This form must be filled out completely with no additions or deletions. **Note that all subcontractors listed below must have a signed Affidavit of Employee Drug Testing Program included with this bid.**

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax payer ID # or Delaware Business license #</u>
1. Concrete	_____	_____	_____
2. Masonry	_____	_____	_____
3. Rough Carpentry	_____	_____	_____
4. Electrical	_____	_____	_____
5. Plumbing	_____	_____	_____
6. Fire Protection	_____	_____	_____
7. HVAC	_____	_____	_____
8. Detention Equipment Contractor	_____	_____	_____

SECTION 111000 - DETENTION EQUIPMENT CONTRACTOR

DESCRIPTION:

Single source responsibility for the Detention Equipment Contractor (DEC).

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 Detention Equipment Contractor.

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

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

RELATED WORK SPECIFIED IN OTHER SECTIONS:

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

QUALITY ASSURANCE:

A. Pre-qualified Detention Equipment Contractors are as follows but not limited to:

Detention Equipment Service Inc.
527 Stanton Christiana Road
Newark, DE 19713
Phone: (302) 633-1737

United Prison Equipment Co., Inc.
6306 Fifth Street
Green Lane, PA 18054
Phone: (215) 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-Listed detention equipment contractors (DEC) who intend to submit a bid on the work

specified in this section shall provide to the General Contractor the following information, with their bid; 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. Submit a listing of all projects in which the Detention Equipment contractor is presently, and has been involved in litigation, and that status thereof.
 5. Submit a current letter from the detention hardware manufacturer stating that the DEC is a factory-trained, fully authorized distributor and installer of their complete line of products.
 6. 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.
 7. Any bidder who fails to submit the above, or submits misrepresented or incomplete information may 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 111940. This consultant must be employed full time by this Detention Equipment Contractor (DEC).

EXECUTION:

The Detention 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 Detention 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 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 Detention 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 Detention Equipment Contractor is installing them.
6. Any other installation not previously mentioned as part of the Detention Equipment Contractor's responsibility.

End of Section

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 BUT NOT INSTALLED 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.
- D. This section is installed by DEC, per Section 111000.

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 042000 – Unit Masonry
- B. Section 055000 – Metal Fabrications
- C. Section 099100 - Painting
- D. Section 111000 - Detention Equipment Contractor
- E. Section 111930 – Security Glass and Glazing
- F. Section 111940 – Hardware (Security & Commercial)

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

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

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.

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.

B. Quality Criteria

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.

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.

- 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 on site 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, Habersham Metal Products and Slate Security. Acceptable commercial manufactures are Curries, Habersham Metal Products, Slate, 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.

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.

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

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.

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

others.

2.02 HOLLOW METAL PANELS

- 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.

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.

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.

- 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)

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.

- 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".

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
	lower and upper intermediate hinges.

of

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

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 affect 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.

- 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