

GUIDE SPECIFICATIONS
FOR
DETENTION SECURITY
TRUSSWALL
CELL SYSTEM

TRUSSBILT, LLC

*(Complies with ASTM F 2322-03 - ASTM F 1450
ASTM F 1592 - ANSI/NAAMM HMMA 863 and UL 752)*

ISO 9001:2000 Certified – ISO 9001 Compliant Since 1998

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**Member of
Hollow Metal Manufacturers Association
Division of the
National Association of Architectural Metal Manufacturers**

NON –SPECIFICATION COMMENTARY

Hollow Metal Detention Security Wall Systems

Detention security hollow metal walls have been successfully used in detention and correctional facilities throughout the world. Architects, Specifiers and End Users understand the advantages of using Detention Security Hollow Metal Walls in these applications.

Description of the TrussWall Modular Hollow Metal Panel System

The system comprises double-skinned hollow metal panels with interlocking rabbeted edges. The panels, manufactured of heavy gauge steel and reinforced with internal truss-shaped steel, receive approximately 32 spot welds per square foot, joining them together. Panels are installed in floor or floor and ceiling channels, and can be fully integrated with steel acoustic or blank security ceilings. Following installation, panels are pumped full of concrete grout to enhance security and substantially reduce sound transmission.

Advantages of TrussWall Hollow Metal Wall Panel Construction

TrussWall systems have important advantages over conventional construction and are a good choice when these special conditions exist:

Retrofit – TrussWall systems have much lower weight than concrete or filled-block construction, and can be transported into the interior spaces of existing structures, unlike modular cell systems

Weight - TrussWall systems lower weight is important where soil-bearing or existing structural concerns require lower weight.

Installation Labor – TrussWall installation involves only bolting down installation channels and stitch welding – commonly available skills. This easy installation is a great advantage where skilled labor is hard to find.

Flexibility - TrussWall systems can be moved and modified subsequent to their original installation, permitting the institution to adapt to new and changing needs.

Delivery – TrussWall panels, including the related doorframes, are installed after primary construction is complete. Their use eliminates any chance of delaying the primary construction effort while detention details and hardware are finalized.

Installation and Maintenance

Installation of TrussWall panels involves simple operations. Heavy steel channels are secured to the floor (and ceiling if a mezzanine is involved) using common expansion bolts. Panels slide into place in these channels, with additional security provided by rabbeted edges. Panels are stitch-welded at top and bottom and are caulked at the joint. Addition of finish paint completes the installation. Panels can be supplied pre-punched for required penetrations, and can be reinforced as needed to support required cell furnishings and appliances.

Hollow Metal Walls Versus Block and Concrete Construction

Filled block and poured or pre-cast concrete are long-established standards for prison construction. Hundreds of successful and secure facilities have been built with these low-cost construction methods. Trussbilt's TrussWall system is intended primarily for circumstances where these established methods would encounter challenges such as lack of appropriate labor, weight issues, retro-fit applications, or the desire to use the skills of locally available labor.

Design Versatility with TrussWall Construction

Hollow metal wall construction provides the Architect with a great deal of freedom in the design of cells and other spaces. The TrussWall system is designed to integrate easily with security window walls, other enclosures and control stations, and all other hollow metal applications in the facility. The manufacturer can also provide heavy-duty prison furniture such as cell bunks, desks, shelves, mess hall tables, benches, etc. that are designed to integrate with the wall system.

Evaluating Detention Barriers

Testing methods have been developed which simulate in the laboratory the use and abuse to which detention materials can be subjected in correctional facilities. One objective of this development work is to provide standardized methods of measuring performance which Architects can require in their specifications. Another objective is to provide manufacturers standardized means of testing and inspecting their products, improving their designs and maintaining high quality construction. Finally, maintenance of rigorous standards and methods of testing construction and performance give assurance of protection to the public, prison employees and the inmates themselves. The performance requirements and methods of testing required by this specification ensure that these standards will be met.

Testing

Five tests are required by this specification. The Wall Impact Load Test is conducted in accordance with ASTM F 2322-03. Bullet Resistance Test is conducted in accordance with UL 752. Acoustical testing is conducted in accordance with ASTM E90-97 and ASTM E1332-94. The other tests provided meet specific needs posed by modular steel wall panel applications.

- A. Wall Assembly Impact Load Tests
- B. Bullet Resistance Test
- C. Wall Delamination Test
- D. Cell Furnishing Static Load Test
- E. Acoustical Test

WALL ASSEMBLY IMPACT LOAD TEST

The Impact Load Test is conducted in accordance with ASTM F 2322-03 Standard Test Methods for Physical Assault on Fixed Vertical Barriers for Detention and Correctional Facilities and provides a measure of a panel system's ability to withstand the treatment it can receive under riot conditions. For this test a three-panel wall system is mounted in a test frame with the entire assembly in the vertical position. The panels are then subjected to a series of impact loads from a pendulum ram. The repetitive impact load specified in this standard was established by experimentation that determined what a person with a sledgehammer or several persons with a battering ram could deliver in the way of impact energy per blow. From consultations with prison officials the time usually required to restore order in a major riot situation was ascertained. It was assumed that a person or persons could assault a wall system throughout this period and based on this assumption the total number of impacts to which the wall would be subjected was determined. Upon completion of the impact testing it is required that no breach be created large enough to allow means of escape. This is indeed a rigorous test and one which, when added to the bullet resistance test, gives a good indication of the performance which can be expected of a wall panel system under riot conditions.

BULLET RESISTANCE TEST

The Bullet Resistance Test is conducted in accordance with UL Standard 752 Level 8. In this test a super power rated rifle is used with military type ammunition. Level 8 is the maximum level for bullet resistance. The term "bullet-resisting" as used in the UL standard signifies protection against complete penetration, passage of fragments of projectiles, or spalling (fragmentation) of the protective material to the degree that injury would be caused to a person standing directly behind the bullet-resisting barrier.

WALL DELAMINATION TEST

Steel wall panel systems rely on a double-skinned hollow metal panel to provide the finished wall for each of two adjacent spaces or cells. **The Delamination (Separation) Test** serves two important functions. First, it demonstrates the integrity of the panel system. In the unlikely event that an inmate succeeded in breaching the first, heavy skin of the system, the construction should pose significant obstacles to removing that skin. In other words, effective performance on the Delamination Test demonstrates that the panel is one integrated structure, not simply two adjacent, independently stiffened steel plates. The second purpose of the Separation Test is to preclude any possibility of the panel structures bulging under the load of grouting. Lastly, this test provides a sound indication that wall panels will not pull apart when wall mounted bunks are mounted on each side of the partition walls.

CELL FURNISHING STATIC LOAD TEST

The Cell Furnishing Static Load Test simulates the panel system's resistance to loads applied to cell furniture that is attached to the wall panel system. This test is important with any wall system as it tests not only the integrity of the wall, but also the furniture item itself.

ACOUSTICAL TEST

The **Acoustical Test** is performed to measure the sound transmission from one side of a panel wall to the other. For these purposes, the intention is to provide an appropriate environment for staff and inmates. A minimum STC rating (sound transmission class) at least appropriate to that normally required for adjacent dwelling units (exceeding 45) ensures appropriate sound control.

Conclusion

This specification is intended to be useful to architects concerned with the design of correctional facilities, and to provide a modular wall system that will provide outstanding service, easy installation, reasonable cost and great security. Trussbilt team members who design and manufacture detention security hollow metal wall systems stand ready to assist architects in their design and specification of these products.

SECTION 11199

SECURITY HOLLOW METAL PANEL WALL SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

This specification section covers the furnishing and installation of base and mezzanine levels cells, comprising two inch thick wall panels filled with concrete grout, together with mezzanine walkway, railing and required stairways. Cells are to be installed on an existing concrete slab, within a completed building structure. The scope of work covered by this section includes furnishing, erecting, installing and finish painting the cells. The panel cell system shall not be employed to carry any structural loads of the surrounding building, equipment, or other items unless specified herein.

1.02 PRODUCTS FURNISHED AND INSTALLED UNDER THIS SECTION

Prior to initiation of the work under this section, contractor will be provided with a completed slab, in conformity with thickness and reinforcing required for seismic and structural requirements at the site. Surrounding structure will be completed, and contractor will have clear access to the location for the erection of all cells, without interference of other trades during cell construction.

- A. Cell Walls comprising two inch thick double skinned steel panels as set out below
- B. Floor of mezzanine level cells comprising steel decking and steel reinforced concrete overlay
- C. Ceiling of mezzanine level cells, comprising double skin security ceilings
- D. Mezzanine walkway, railings and staircases
- E. Security hollow metal doors, frames and chases for the cell modules only
- F. Detention hardware, including cell door, chase door, for cell modules only, but excluding any control system elements that connect to hardware
- G. Required security hollow metal window/light if specified for cells
- H. All floor and ceiling channels and miscellaneous cell panel connection materials as required
- I. Concrete Grout filling of all cell wall panels
- J. Installation of metal conduit for electrical connections as required
- K. Supply and return air grilles
- L. Detention furnishings, including bunk, desk, stool, shelf, mirror
- M. Detention lavatory commode combo units
- N. Electrical items, including cell light fixture, intercom, call button, as specified herein
- O. Security glazing, including cell door vision and cell window

1.03 RELATED SECTIONS

- A. Detention Hardware 11190 (or 08780)
- B. Security Glass and Glazing Materials 08800 (or 11190)
- C. Gaskets and Weather-strip 08720 (or 11190)
- D. Section [11190] - - - Installation of Detention Security Hollow Metal Doors & Frames
- E. Section 03300 - - - - Cast in Place Concrete: Item(s)
- F. Section 03350 - - - - Concrete Floor Finishing: Item(s)
- G. Section 03400 - - - - Pre-cast Concrete: Item(s)
- H. Section 04200 - - - - Masonry System: Item(s)
- I. Section 05120 - - - - Structural Steel: Item(s)
- J. Section 08110 - - - - Commercial Hollow Metal Doors and Frames
- K. Section 08113 - - - - Commercial Security Hollow Metal Doors and Frames
- L. Section 08130 - - - - Stainless Steel Hollow Metal Doors and Frames
- M. Section 08348 - - - - Swinging Sound Control Hollow Metal Doors and Frames
- N. Section 08580 - - - - Operable Windows
- O. Section 08740 - - - - Detention Locking Control Systems: Item(s)
- P. Section 09900 - - - - Painting: Item(s)

1.04 REFERENCES

- A. ASTM A 1008 / A 1008M-05, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
- B. ASTM A 1011 / A 1011M-05, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- C. ASTM A 653/A 653M-05, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dipped Process, (Commercial Steel)
- D. ASTM A240/A240M, Standard Specification for Chromium-Nickel stainless steel plate, Sheet and Strip.....
- E. ASTM C 143 / C 143M-05, Standard Test Method for Slump of Hydraulic Cement Concrete
- F. ASTM-E119, Standard Methods of Fire Tests of Building Construction and Materials
- G. NFPA-251, Fire Tests of Building Construction and Materials
- H. UL-263, Fire Tests of Building Construction and Materials
- I. CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials
- J. ANSI A 250.10 – 1998 (R2004), Standard Test Procedure and Acceptance Criteria for

- Prime Painted Steel Surfaces for Steel Doors and Frames
- K. ASTM F 1450-97 (2004), Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities
 - L. ASTM F 1592-01, Standard Test Methods for Detention Hollow Metal Vision Systems
 - M. ASTM F 2322 – 03, Standard test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities
 - N. NAAMM HMMA 803-98, Steel Tables
 - O. HMMA-820 TN01-03, Grouting Hollow Metal Frames
 - P. NAAMM HMMA 840-99, Installation and Storage of Hollow Metal Doors and Frames
 - Q. ANSI / NAAMM HMMA 866-01, Guide Specifications for Stainless Steel Hollow Metal Doors and Frames
 - R. ANSI / NFPA 80-1999, Fire Doors and Windows
 - S. ANSI / NFPA 252-1999, Standard Methods of Fire Tests of Door Assemblies
 - T. ANSI / NFPA 257-2000, Methods for Fire Test of Window Assemblies
 - U. ANSI / UL 9-2000, Fire Test of Window Assemblies, 7th Edition
 - V. ANSI / UL 10B-2001, Fire Test of Door Assemblies, 9th Edition
 - W. ANSI / UL 10C-2001, Standard for Positive Pressure Fire Tests of Door Assemblies, 1st Edition
 - X. ICBO UBC 7-2 (1997), Fire Tests of Door Assemblies
 - Y. ICBO UBC 7-4 (1997), Fire Tests of Window Assemblies
 - Z. UL 752-00, 10th Edition, Bullet Resisting Equipment
 - AA. ASTM C1019, Standard Test Method for Sampling and Testing Grout

1.05 TESTING AND PERFORMANCE

Performance grades for each detention cell wall and detention hollow metal openings shall be as indicated on the contract documents. Performance test requirements for each cell and opening shall be as indicated for individual grade number designations shown in the tables in ASTM F 2322, ASTM F 1450 and ASTM F 1592. Test procedures shall be performed on wall designs as described in Sections A, B, C, D, E, F and G.

A. Wall Assembly Impact Test performed in accordance with ASTM F 2322-03

1. Scope and Significance

This test method is a simulated service test for determining the performance characteristics of walls designed to incarcerate inmates in detention and correctional institutions. The testing provides for the setup and impact testing of a sample wall.

2. Test Sample

A wall consisting of two 8'-0" x 8'-0" (914 mm x 2438 mm) wall sections shall be constructed in accordance with section 2.02.

3. Test Requirements

Subject one location on the sample wall to 600 blows equally divided between a sharp and a blunt impactor. The blunt impactor shall deliver the required impacts at 200 foot pounds per impact while the sharp impactor shall deliver the required impacts at 100 foot pounds per impact to the sample location. Repeatability of impact location during each series shall be no more than +/- 2 inches horizontally and vertically from the designated impact target. Testing shall take no longer than 60 minutes. Specimen fails if a 5" x 5" x 8" rectangular box can pass through the wall following impacts.

B. Wall De-lamination Test

1. Scope and Significance

This test documents the overall integrity of the panel system, resistance to possible delamination, and prevention of bulging of panels during grout application.

2. Test Sample

A 4' X 4' (101.6 mm X 101.6 mm) sample shall be constructed in accordance with section 2.02 in this specification. No end closing pieces are to be used in this test.

3. Apparatus

Using a steel I-beam table capable of withstanding a load of 10,000 pounds with no deflection, fix to the tabletop a steel I-beam enclosure to accommodate the sample.

4. Procedure

- a. Mount the sample in the test fixture and weld the bottom face sheet at its center to the I-beam tabletop.
- b. Weld a 3" x 3" (76.2 mm X 76.2 mm) .250" (6.4 mm) thick steel plate centered on the top face sheet. Center on the 3" x 3" (76.2 mm X 76.2 mm) .250" (6.4 mm) thick steel plate an eyelet.
- c. Using a hydraulic porta-power and a calibrated load cell to measure pounds force, pull on the eyelet in an upward direction.
- d. Use a dial indicator to measure the deflection at the center of the sample.

5. Pass/Fail Criteria

Apply 3000 pound load and measure the deflection. The maximum deflection allowable is .125" (3.2 mm).

C. Bullet Resistance Test

1. Where specified on individual openings, bullet resistance shall be certified by the application of the laboratory bullet resistance rating label on the door for the opening indicating compliance with the testing procedure described in UL Standard 752. The bullet resistance rating shall be Level 8.

D. Cell Furnishing Static Load Test

1. Scope

This test simulates a wall panel's resistance to bending when loads are applied to cell furnishings.

2. Significance of Use

The primary purpose of this test is to approximate the levels of pressure apparent when an inmate jumps on the outer edge of a bunk, desk or stool.

3. Test Sample

Erect a wall or use the same wall as specified under the Wall Impact Test consisting of three 3'-0" x 8'-0" (914 mm x 2438 mm) panels constructed in accordance with section 2.02.

4. Apparatus

Attach the piece of furniture by typical means (bolting or welding) to the wall panel system.

5. Procedure

Apply a load to the outer edge of the furniture item using a hydraulic porta-power and a load cell to measure pounds force. Apply 1,500 pounds.

6. Pass/Fail Criteria

No permanent visible disfigurement is allowed to the wall panel system.

E. Acoustical Tests

Erect a wall or use the same wall as specified under the Wall Impact Test consisting of three 3'-0" x 8'-0" (914 mm x 2438 mm) panels constructed in accordance with section 2.02.

Conduct these tests in accordance to: ASTM E90-97 Standard Test Classification for Determination of Sound Transmission Class. (Minimum STC class rating of 45-49), and ASTM E1332-94 Standard Test Classification for Determination of Outdoor-Indoor Transmission Class. (Minimum OITC class rating is 41)

F. Fire Rated Wall Assemblies

Where indicated, supply fire rated temperature rise walls with ratings of one hour or two hour rating as determined and scheduled by the Architect. Such products shall be tested in accordance with ASTM-E119, Standard Methods of Fire Tests of Building Construction and Materials; CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials; NFPA-251, Fire Tests of Building Construction and Materials; UBC-7-1-94, Uniform Building Code Standard; UL-263, Fire Tests of Building Construction and Materials; and shall be constructed as listed and/or classified by a recognized testing agency having a factory inspection service.

G. Test Reports

The manufacturer shall provide test reports and documentation by an independent testing laboratory documenting successful completion of each performance test.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualification

1. Manufacturer shall provide evidence of having personnel and plant equipment capable of fabricating hollow metal wall panel assemblies of the type specified herein. Manufacturer shall provide current documentation of the number of employees, a listing of their production equipment, and a description of their manufacturing facility.
2. Manufacturers shall be ISO 9001:2000 certified and shall be required to present their Certificate of Registration upon request. The manufacturer's registrar shall be nationally recognized and shall provide the manufacturer with periodic factory follow-up audits reaffirming the manufacturer's continuing compliance with their written quality program.
3. Manufacturers must have evidence that they have retained a structural engineering firm licensed in the state of [].
4. Manufacturer's production welders shall be qualified under AWS D1.3 and upon request shall provide copies of Welders Certifications in accordance with AWS D1.3.
5. Manufacturers shall have evidence of having successfully completed a steel wall panel project of at least 100 cells that has been in continual operation for minimum of ten (10) years.
6. The manufacturer shall provide a list of a minimum of 25 successfully completed steel wall panel projects where at least six were over 100 cells and at least one was over 750 cells. This list shall identify completion dates, the names and addresses of the architects of record, and the installing DEC's.
7. Manufacturers shall have written test reports of their having passed the testing requirements of section 1.05 using their current materials and production processes.

B. Acceptable Manufacturers

Trussbilt, LLC - New Brighton, MN.
651.633.6100 Fax: 651.628.9482
Website: www.trussbilt.com

C. Quality Criteria

1. All panel construction shall be in accordance with construction of assemblies which meet the requirements of Sections 1.05 and 1.06.
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. Job Site Panel Check

At the owner's option, a panel at the job site shall be selected at random and sawed in half or otherwise taken apart as deemed necessary for verification that construction is in accordance with these specifications. The manufacturer shall include the cost of the replacement panel in his quotation. If the panel construction does not conform to these specifications the non-conforming panels shall be repaired or replaced at the manufacturer's expense.

1.07 SUBMITTALS

A. Submittal Drawings

1. Show panel elevations and sections.
2. Show listing of opening descriptions including locations, material thicknesses and mounting system.
3. Show location and details of all openings.
4. Indicate performance grade levels on the submittal as they are shown on the contract drawings and in the door schedule.

B. Samples (if required)

1. Panel: 1'-0" X 1'-0" (305 mm x 305 mm) corner section showing internal construction.
2. 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 the samples can be cause for rejection of the work.

C. Test Report

1. Manufacturer shall submit to the architect, ten (10) days prior to bid date, an independent testing laboratory reports certifying that products meet all test requirements set forth in Section 1.05 above.

D. Qualifications

Manufacturer shall submit to the architect, ten (10) days prior to bid date, his qualifications as required by Paragraph 1.06.

E. Engineering Documentation

1. Manufacturer shall provide certification by an independent professional engineering firm documenting the required welding schedule for the panels, floor channels and the like, and establishing required ceiling/mezzanine structures. Engineering documentation shall address compliance with structural requirements and seismic issues.

1.08 WARRANTY

All panels shall be warranted from defects in workmanship and quality for a period of ten (10) year from shipment.

PART 2 - PRODUCTS

2.01 HOLLOW METAL WALL PANELS

A. Materials

1. Panel face sheets, mounting angles, channels and cover plates shall be constructed of [0.067 in. (1.7 mm)] [0.093 in. (2.3 mm)] minimum thickness and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653M Commercial Steel (CS), coating designation A60 (Z180). The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
2. Floor mounting channels shall be constructed of [0.093 (2.3 mm)] [.123 in (3.1 mm)] minimum thickness steel conforming to ASTM A 653/A 653M Commercial Steel (CS), coating designation [A60 (Z180)] or stainless steel meeting ASTM A240/A240M, [Type 409]. For severely corrosive conditions, channels shall be stainless steel meeting ASTM A240/A240M, [Type 304].
3. For severely corrosive conditions and where specified, panel face sheets shall be constructed of 0.093 in. (2.3 mm) minimum thickness stainless steel meeting ASTM A240/A240M Type 304.
4. All panels shall be fully grouted in the field by the wall panel manufacturer. Grout specifications shall be the manufacturer's proprietary design which meets or exceeds all requisite testing per section 1.05, structural and seismic requirements, fire resistance and STC ratings specified for this project.

B. Construction

1. All panels shall be of the types and sizes shown on the approved submittal drawings, shall be constructed in accordance with the specifications and shall meet the performance requirements of section 1.05. A through G, where applicable.

2. Panel face sheets shall be joined at their vertical edges by a continuous rabbeted joint extending the full height of the panel.
3. Panel thickness shall be 2 in. (50 mm) minimum and furnished with grout holes along the top edge for grouting in place at the job site. After grouting, grout holes will be concealed by a coverplate. Panels shall be neat in appearance and free from warpage or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of material used.
4. Panels shall be stiffened by one of the following systems:
 - a. Continuous steel truss design core material, .015 in. (.4 mm) minimum mild steel, having truncated triangular sections extending continuously from one panel face to the other, spot welded to each face sheet 2 ¾ in. (69.9 mm) oc horizontally and 3 in. (76.2 mm) oc vertically. Core material shall extend full height and width of panel.
 - b. Rolled or formed 1/8 in. (3.2 mm) mild steel channels extending from top to bottom of panel and continuous from one face to the other, spaced not more than 4 in. (101.6 mm) oc and welded to both panel faces not more than 3 in. (76.2 mm) oc vertically.
5. Door frames, Windows, Vents
 - a. Where specified, panels shall be provided with cutouts reinforced with steel moldings, not less than 0.093 in. (2.3 mm) to secure door frames, windows, and air venting grills in accordance with sizes shown on the contract drawings. Moldings for windows will have an additional 0.093 in. (2.3 mm) back up reinforcement for glass stop screws.

2.02 FIRE RATED HOLLOW METAL WALL PANELS

A. Materials

2. Panel face sheets shall be constructed of 0.093 in. (2.3 mm) minimum thickness and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A 653M Commercial Steel (CS), coating designation A60 (Z180). The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
2. Floor mounting channels, mounting angles, channels and cover plates shall be constructed of 0.123 in. (3.12 mm) minimum thickness steel conforming to ASTM A 653/A 653M Commercial Steel (CS), coating designation A60 (Z180).
3. All panels shall be fully grouted in the field by the wall panel manufacturer. Grout specifications shall be the manufacturer's proprietary design which meets or exceeds all requisite testing per section 1.05, structural and seismic

requirements, fire resistance and STC ratings specified for this project.

B. Construction

2. All panels shall be of the types and sizes shown on the approved submittal drawings, shall be constructed in accordance with the specifications and shall meet the requirements of section 1.05. F.
2. Panel face sheets shall have rabbeted edges that are not directly connected via steel to steel contact to preclude heat transfer the full height of the panel.
3. Panel thickness shall be 2-29/32 in. (74 mm) minimum and furnished with grout holes along the top edge for grouting in place at the job site. After grouting, grout holes will be concealed by a coverplate. Panels shall be neat in appearance and free from warpage or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of material used.
4. Panels shall be stiffened by the following system:
 - a. Continuous steel truss design core material, .015 in. (.4 mm) minimum mild steel, having truncated triangular sections extending continuously from one panel face to the other, spot welded to one face sheet and internal reinforcing 2 ¾ in. (69.9 mm) o.c. horizontally and 3 in. (76.2 mm) o.c. vertically. Core material shall extend full height and width of panel.
5. Door frames, Windows, Vents
 - a. Where specified, panels shall be provided with cutouts reinforced with steel moldings, not less than 0.093 in. (2.3 mm) to secure door frames, windows, and air venting grills in accordance with sizes shown on the contract drawings. Moldings for windows will have an additional 0.093 in. (2.3 mm) back up reinforcement for glass stop screws.

2.03 CELL CEILING and MEZZANINE LEVEL COMPOSITE DECKING

A. Materials

1. Cell Ceiling
 - a. Where indicated on the reflective ceiling plans the wall panel manufacturer shall supply double skinned 2" thick ceiling panels specified herein under [Section 11195], providing a single source integrated cell package.
2. Mezzanine Level Walkway and Composite Decking
 - a. Intermediate cell levels shall be provided with composite steel decking forming the ceiling for the lower level cell and the floor of the upper level cell.

The metal decking shall be supplied by the wall panel manufacturer. The steel reinforced concrete topping shall be designed by the wall panel manufacturer and installed by the DEC to ensure an integrated cell system conforming to the structural and seismic requirements specified elsewhere herein.

2.04 WALL PANEL FINISH

After fabrication, all tool marks and surface imperfections shall be filled and sanded as required to make face sheets, vertical edges and weld joints free from irregularities. After appropriate metal preparation, all exposed surfaces of panels 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.

In order to minimize removal of zinc galvanizing material from panel surfaces, panels shall only be sanded to reduce overly pronounced spotwelds. Light, visible spotwelding marks from the fabrication process will be visible after finish painting and shall not be deemed cause for rejection of panel surfaces.

PART 3 - EXECUTION

3.01 SITE STORAGE AND PROTECTION OF MATERIALS

- A. The contractor responsible for installation shall remove wraps or covers from panels, doors, frames, and cell furnishings 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 or dunnage in a dry location. Panels shall be stored in a horizontal 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:

- A. Prior to installation, all panels, mounting channels and angles shall be checked for size and staged at the appropriate locations.
- B. After installation, wall panels shall be fully grouted by the panel manufacturer.
- C. Stitch weld panels to floor channels and wall and ceiling mounting angles as required by engineering documentation and manufacturer's recommendations. Caulk between welds using a two-part epoxy caulk, Pecora Pick Proof Caulk or equivalent. Exposed field welds shall be finished smooth and touched up with a rust inhibitive primer.

- D. Any grout or other bonding material shall be cleaned off of panels immediately following installation. Exposed panel surfaces shall be kept free of grout, tar, or other bonding material or sealer.
- E. Install mezzanine level decking and concrete flooring for mezzanine level cells, in accordance with engineering standards, and thereafter install mezzanine level cells, railings and stairways.
- F. Install required mezzanine cell ceilings, welding in accordance with manufacturer's recommendations.
- G. 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 comparable and compatible to shop applied primer.
- H. Finish paint cell walls, security hollow metal doors and frames and cell ceilings in accordance with specification section 09900. Paint damage occasioned by installation of cell furniture, plumbing, electrical or other trades shall be corrected by the firm having responsibility for finish painting under section 09900.
- I. Clean and remove debris, leaving cells ready for installation of plumbing, electrical, heating/ventilating, furniture and other trades or materials.